BULLETIN OF MISCELLANEOUS INFORMATION Appendix 1933
ROYAL BOTANIC GARDENS, KEW

REVIEW OF THE WORK OF THE ROYAL BOTANIC GARDENS, KEW, DURING 1933.

General.

STAFF.—Mr. W. N. WINN retired under the age-limit from the post of Botanist (previously Assistant) in the Curator's Office on June 19th, after over 43 years' service at Kew (see K.B. 1932, 408, where the date June 15th is given in error). Mr. R. F. WILLIAMS has been appointed Higher Grade Clerk in succession to Mr. Winn.

Mr. S. A. SKAN retired from the post of Botanist in the Herbarium on September 30th, 1933 (K.B. 1933, 462). Mr. Skan had discharged the duties of Librarian for many years ; the general supervision of the Library has now been undertaken by Dr. T. A. SPRAGUE, Deputy Keeper of the Herbarium and Library, with Mr. E. NELMES, Assistant Botanist, as his assistant.

Mr. N. Y. SANDWITH, Temporary Botanist, has been appointed Botanist in the place of Mr. Skan.

DR. O. STAPF.—Kew has suffered a great loss by the death on August 4th of Dr. O. Stapf, F.R.S. (K.B. 1933, 369). Since his retirement from the Keepership of the Herbarium in 1922, Dr. Stapf had worked continuously at Kew in his capacity as Editor of the " Botanical Magazine " and Hon. Editor of the " Index Londinensis" on behalf of the Royal Horticultural Society. The Director has been appointed Editor of the " Botanical Magazine " in succession to Dr. Stapf and work on the supplement to the " Index Londinensis " is being carried on under the direction of Mr. W. C. Worsdell.

OFFICIAL VISITS.—MR. R. A. DYER, Assistant for South Africa, spent four weeks on the Continent during September. He visited Botanical Institutions at Paris, Geneva, Vienna, Zurich, Berlin, Stockholm and Uppsala. The tour was made at the request of the South African Government and was financed partly by them and partly by Kew. Mr. Dyer was able to accomplish much useful work, both on behalf of the herbaria in South Africa and in connexion with investigations being carried on at Kew. Special opportunity was taken of exchanging views with the many botanists whom he met during his tour and by whom he was received with uniform kindness and hospitality.

Collecting Expeditions.—Mr. J. B. Gillett returned to England early in April having completed his work on the British Somaliland-Ethiopia Boundary Commission, the commencement of which was described in last year's "Annual Review" (p. 4). Early in 1933 Mr. Gillett visited the dry districts east of Berbera, where, owing to unusually good winter rains, the subdesert flora was seen under very favourable conditions. These winter rains in the coastal districts are not recorded in official meteorological reports, but they appear to be a regular and important climatic feature. In order to study their effect further, Mr. Gillett revisited the plateau north of Buramo at the beginning of February.

On February 12th, Mr. Gillett left British Somaliland for Harar in the botanically little known country in the east of Abyssinia. Here he spent a month collecting in the mountain districts to the east and west of the town. Mr. Gillett returned to England at the beginning of April, having spent three days collecting at Aden *en route*.

He collected in all 1621 numbers, in addition to living roots, bulbs and seeds of the more interesting or showy plants. He also paid special attention to the ecology of the region and to the economic properties of the indigenous flora. He has made several constructive suggestions on such subjects as overgrazing, plant introduction and the improvement of existing crops, and these have been incorporated in a full report presented to the Colonial Office. An account of his ecological work and an enumeration of his collections will appear in due course.

During his stay in Africa Mr. Gillett received every possible assistance from Colonel E. H. M. Clifford, Senior British Commissioner, from other officers of the Boundary Commission, and from the District Officer in the areas visited. At Harar, through the kindness of H.M. Consul, Captain Long, he was able to make the British Consulate his base for expeditions into the neighbouring mountains.

When Mr. Gillett left the Commission, Colonel Clifford arranged for Major H. C. Godding to continue making botanical collections on behalf of Kew, and a consignment of plants has already been received from him.

Mr. W. G. Eggeling, Assistant Conservator of Forests, Uganda, has sent home two valuable collections of dried plants, one from Mt. Mfumbiro in the Virunga volcanic region, and the other from Mt. Ruwenzori. These expeditions were undertaken with the aid of the Empire Marketing Board grant to Kew for overseas missions and collecting purposes.

Banana Research.—The collection and propagation of banana types for ultimate despatch, after quarantine, to the Imperial College of Tropical Agriculture at Trinidad has been continued. The majority of those obtained from the Malayan region have been despatched and fresh collections from the east and west coasts of

peninsular India are now being established. Thanks are due to the Directors of Agriculture in Madras and Bombay for their ready co-operation in this work. In addition to the regular work of this quarantine house, it has been found possible to propagate suckers of three varieties of *Musa textilis* obtained from Malaya and intended for the Department of Agriculture in Uganda. This important service was considered necessary owing to the danger of introducing disease, which might have disastrous consequences in those parts of East Africa where the fruits of edible species of *Musa* enter so largely into the diet of the native races.

Sorghums.—With the collaboration of the Directors of Agriculture in those parts of the empire where Sorghum is indigenous, very large collections of herbarium specimens of varieties and types of this important cereal crop have been brought together in the herbarium. Accompanying these specimens there is a mass of cultural data, and Mr. J. D. Snowden, lately Botanist in the Agricultural Department in Uganda, is now making a critical examination of this material, thanks to the help of the Bentham-Moxon Trustees, with a view to preparing a memoir on this crop.

Cowpeas (*Vigna unguiculata* (L.) Walp.).—Work on somewhat similar lines to that on Sorghums has been commenced with this important pulse crop. A questionnaire on the subject has been circulated and many Directors of Agriculture are making arrangements to collect and grow local varieties so that definite herbarium material and cultural information can be obtained. The ready co-operation of Agricultural Departments in this work, which entails considerable labour in addition to their normal duties, is very gratifying and shows that the value of such crop studies is appreciated by the departments concerned.

Plant and Seed Introduction.—With a view to gaining accurate knowledge regarding the cultivated crop plants of the Empire, information regarding their occurrence has been collected through the various Agricultural Departments by means of a questionnaire. This information has now been indexed with a view to publication. Such a publication should prove of great value to the agricultural development of the countries concerned by indicating where seeds and plants of particular species required in connexion with crop improvement can be obtained.

Tung Oil.

Aleurites Fordii.—It is now definitely established that this species will not thrive in the moist tropics, though where there are definite dry seasons and the elevation is sufficiently great to alleviate the temperature the possibilities of this becoming a crop of economic importance are still being studied.

Aleurites montana.—A further supply of seed of this species, obtained from China, has been distributed. Reports on the growth

of *A. montana* are now being received and it is satisfactory to note that the likelihood of its suitability for cultivation in more tropical countries is being substantiated.

Director's Office.—The reorganisation of the Registry, recorded in the last "Annual Review" (p. 6), is now complete and the benefit of a really efficient system under a Registry Clerk is being felt by all departments of the establishment.

Publications.—Ten numbers of the "Kew Bulletin" were published during the year, the present "Review" forming an appendix and completing the volume for 1933. The "List of Seeds" was published as a separate pamphlet in December.

The new editions of the handlists of "Trees and Shrubs" and "Rock Garden Plants" are still in the course of preparation. The former will appear early in 1934 and the latter shortly afterwards.

Section 2 of volume 5 of the "Flora Capensis" was published on March 25th, thus completing the work as originally planned (K.B. 1933, 367). Part 6 of volume 9 of the "Flora of Tropical Africa," completing the account of the subfamily *Panicoideae*, was published on Jan. 1st, 1934.

The Gardens.

Visitors.—The number of visitors to the Gardens in 1933 was 1,226,057—weekdays (not students' days) 619,778; students' days 110,107; Sundays 496,172—an increase of 157,662 as compared with the figures for 1932.

The greatest monthly attendance was in April with 253,826 and the lowest in December with 7090. The highest daily attendance was 69,409 on Whit-Monday, June 5th; the lowest was 17 on January 13th.

General.—The summer of 1933 was characterised by prolonged spells of hot and dry weather, which entailed much extra labour and expense in watering. During the year 45,000,000 gallons of water were used, the peak consumption being 2,656,000 gallons for the week ending August 14th; the consumption was 2,481,000 and 2,189,000 gallons respectively during the weeks ending September 4th and 11th. Plants in the Gardens do not appear on the whole to have suffered any material injury, the supply of water being sufficient to meet the requirements created by the conditions of drought. It is possible, however, that the unusual dryness may yet show ill effects among some of the older trees, particularly beeches. One result of the hot summer was the ripening of fruits which seldom mature at Kew, viz.—*Sophora japonica, Catalpa bignonioides, Liriodendron Tulipifera, Aesculus parviflora, Asimina triloba, Parrotia persica, Corylus mandshurica, Diospyros virginiana* and *D. kaki*.

Beating the Bounds.—On Wednesday, May 24th, the ancient ceremony of "Beating the Bounds" of Kew Parish was revived.

Part of the boundary crosses the Gardens and the Director accompanied the party for a portion of their course.

Decorative Department.—Following the removal of the clipped yews on the south side of the Palm House, the gravel paths which they bordered have been broken up and turfed down, thereby adding considerably to the restfulness of the scene.

In the Melon Yard, House no. 22 has been re-roofed and partly reconditioned.

A shelter made of western red cedar (*Thuja plicata*) has been erected in Cambridge Cottage Garden, through the kindness of Messrs. Gabriel, Wade and English, Ltd. (see Kew Bull. 1933, 254).

Rock Garden.—Several sections in the Rock Garden have been reconstructed, the opportunity being taken to provide fresh compost and to afford deeper root runs. A section has been cleared specially and prepared for the accommodation of the Sedum collection. This new grouping should make the work of comparison and identification easier in the future.

Temperate House.—The work of replacing the old saddle boilers has been continued, six new sectional type units having been installed. The iron ventilators on the side of the south wing have been replaced by others made of teak, whilst the floor of the gallery is at present undergoing repair. Two bins for the reception of ashes from the stokeholds have been constructed and as they are recessed into the terrace they should do away with what, for many years, has been an unsightly feature.

New and rare plants which flowered during the year were *Vallea stipularis*, a rare Tilaceous tree ; *Rhododendron Parryae*, a new May-flowering species from Burma, raised from seed received from Mrs. A. D. Parry, Lushai Hills, Assam, in 1929 ; and *Camellia saluenensis*, a new species from China, received as *Camellia speciosa* from Mr. J. C. Williams, Caerhays Castle, Cornwall.

Arboretum.—The alterations to the shrubbery leading from House no. 1 to the Palace, which were commenced last year, have been completed and add considerably to the amenities of that section of the Gardens.

It has been felt for some time that the network of cross paths separated by patches of tall Rhododendrons and Berberis at the north end of the lake was unsatisfactory, but it was not until the present winter that sanction could be obtained for a special grant to employ 12 extra labourers to help in effecting an improvement. By the end of the year the redundant paths had been eliminated and much of the undergrowth had been cleared away, thus opening up new and unexpected vistas over green slopes down to the edge of the lake.

By the aid of the same grant the construction of a road round the depot in the Palace Nursery and other work has been put in hand.

The bright red brick piers of the gateways leading into Cambridge Cottage Garden, erected in 1906, when the area was presented to Kew by H.M. King Edward VII, have been rebuilt with old bricks and now harmonise with the old wall of the Garden. Further, the western gateway, which previously afforded a view only of the herbaceous border, has been moved a few yards to the East, thus rendering visible from the outside considerably more of the garden, including the new western red cedar shelter. This improvement has necessitated the alteration of the line of the path leading towards the "T" Range, which now runs in a long "S" curve from the gateway to Cumberland Mound.

TROPICAL DEPARTMENT.—Palm House. Repairs have been carried out to the ironwork; that on the exterior of the structure has been repainted. A section of the central hotwater pipes has been overhauled and fitted with new valves. The steps leading down to the pond in front of the house have been lifted and reset.

"T" Range.—Hotwater pipes in the Orchid Show Houses have been re-levelled and new valves fitted.

In House no. 9 the 10-inch hotwater main has been renewed and placed under the pathway where it will be accessible for examination and repair.

Ferneries.—Except for the central wing, House no. 2 has been thoroughly overhauled and the interior and exterior have been repainted. The hotwater pipes in the Fernery Pits have been overhauled and new valves installed.

New hotwater mains have been laid into House no. 5 and the centre bed at the south end has been rearranged so as to allow a bed to be made up and planted with a collection of Proteaceous plants presented by the Hon. Mrs. E. Ryder (see p. 14).

In the Office Yard a new sectional boiler has been installed in place of two of the old saddle type.

Amongst the plants which have attracted special interest in this department during the year may be mentioned *Nymphaea micrantha*, which produces young plants adventitiously on its leaves, *Victoria regia*, which was exceptionally fine and remained in good condition for much longer than usual, and the pitcher plants (*Nepenthes*).

RAINFALL RECORD.

Rainfall recorded at the Royal Botanic Gardens, Kew, during 1933:

	Inches.		Inches.
January	1·51	July	2·08
February	2·65	August	0·61
March	2·20	September ...	2·38
April	0·69	October	1·26
May	1·71	November	1·04
June	2·10	December	0·31

Total 18·54 inches.

The total for 1932 was 21·84 inches.

Exhibition of S. African Wild Flowers at Vincent Square.—In October an interesting exhibition of S. African wild flowers was staged at Vincent Square under the auspices of the Royal Horticultural Society. Many of the plants were subsequently presented to Kew by the S. African authorities responsible for the exhibition. Among the most valuable of the acquisitions are a collection of *Aloe* species from Mr. A. W. van den Houten, a series of small pans of succulents, some of them exceedingly rare species, from Dr. J. Luckhoff, a collection of *Proteaceae* grown by the Hon. Mrs. E. Ryder at Durns, on the Solent, and a selection of cut flowers for incorporation in the herbarium.

Tropical Fish.—In January Mr. A. E. Hodge, Editor of "The Aquarist & Pondkeeper," suggested that angel fish might be introduced into the *Victoria regia* tank in House no. 10, and kindly offered to arrange for the supply of suitable stock. Following on his suggestion a number of fish was presented by Messrs. Cura & Sons, and the Derham Fish Farm, Ltd. These have bred successfully and there are now nearly sixty young ones.

In addition eight Japanese telescopic-eyed moors were presented by the Rev. Bertram Stower, and it is hoped that they also will become successfully established.

Waterfowl.—The principal additions during the past year have been a pair of black-necked swans generously presented by Mr. Alfred Ezra, F.Z.S., of Foxwarren Park, Byfleet, who also presented a pair of carolina ducks; a pair of bernicle geese received from St. James's Park in exchange; a pair of muscovy ducks presented by Mr. J. S. Romer; and a pair of falcated teal, a shoveller duck, two pairs of garganey and two pairs of common teal, all received by way of exchange. One of the storks strayed away for some time during the summer and was eventually recaptured on the Mid-Surrey Golf Course, and restored to its mate in the Gardens.

Student Gardeners.—Although the general depression continues to affect the outflow and inflow of students the position as a whole in regard to the year now under review is satisfactory and shows a slight improvement upon 1932.

Outgoing Students.—Seventeen men completed their training and secured appointments as follows:—

Home.—Botanic Garden, Cambridge—one; Parks Departments—eight; Reading University (with scholarship) one; Nurseries—two.

Overseas.—Chile (Tierra del Fuego)—one; Italy (including an Italian who returned to La Mortola)—two; New Zealand (Dunedin Botanic Garden)—one; Spain—one.

One other, who was due to return to Kew from La Mortola, secured an interesting position on the Riviera, whilst three men, by

exchange arrangements, proceeded to Berlin Botanic Garden, La Mortola and France respectively.

New Entrants.—Seventeen men—all British subjects—were appointed to the full-course vacancies and were recruited as follows :—

Parks Departments—six ; Botanic Garden, Cambridge—one ; St. John's College Garden, Cambridge—one ; nurseries or private gardens—nine, of whom one returned from the U.S.A., whilst another came from New Zealand.

In addition, under the exchange arrangements referred to above, one man came from Berlin and another—the son of a former Kew student now a nursery proprietor—from Louveciennes, France.

Apart from the above changes four young Dutch students were admitted for short courses of instruction varying in duration according to individual requirements. Two of them returned to Holland before the end of the year ; two will complete their studies in the early part of 1934.

Contributions to the Gardens, 1933.—During the year, 1107 separate consignments of living plants, seeds, etc., were received and added to the collections. The record set up in 1932 is thus broken by an increase of 53. The following were the more important donations :—

Public Institutions :—

Amani, East African Agricultural Research Station.—A varied collection of plants, tubers, bulbs and seeds.

Arnold Arboretum, U.S.A.—Seeds, including *Gentiana crinita* and *Cladrastis platycarpa*.

Auckland, New Zealand Institute of Horticulture.—Kawau orange trees grown on different stocks.

Berkeley, Botanic Garden, University of California.—Large consignments of seeds.

Berlin, Botanic Gardens.—Seeds, various.

Bermuda, Department of Agriculture.—2 cases of bulbs of *Lilium Harrisii*.

British Somaliland-Ethiopia Boundary Commission (through Mr. J. B. Gillett).—Tubers and seeds.

Budapest, Royal Hungarian Horticultural College.—Plants, including *Campanula Kladriana*, *Statice tatarica* and *Veronica Baumgarteni*.

Calcutta, Royal Botanic Gardens.—Seeds, including *Trapa natans*.

Cambridge Botanic Garden.—Collection of plants, including *Adiantum* spp., and various seeds.

Canberra, Commonwealth Forestry Bureau.—Seeds of *Hibiscus insularis*.

Chelsea Physic Garden.—22 packets of seeds.

Darjeeling, Lloyd Botanic Gardens.—98 packets of seeds.

Dehra Dun, Forest Research Institute.—Seeds of *Saxifraga Stracheyi* and *Lilium giganteum*.

Dublin, Trinity College Botanic Garden.—Seeds of *Quercus glabrescens*.

Dunedin, Botanic Gardens.—Collection of plants and seeds.

Edinburgh, Royal Botanic Garden.—Plants, including *Gesneriaceae*, seedlings and seeds.

Glasnevin, Botanic Gardens.—36 packets of seeds, and plants of *Sarracenia* spp.

Göttingen, Botanic Garden.—54 packets of seeds.

Grahamstown, Albany Museum.—Plants of *Haworthia* and *Mesembryanthemum* spp.

Hatzendorf, Botanic Garden.—Collection of plants and seeds.

Illinois, Morton Arboretum.—22 packets of seeds.

Kirstenbosch, National Botanic Garden.—95 packets of seeds, and rooted cuttings of *Pelargonium* spp.

Lausanne, Botanic Garden.—30 packets of seeds.

London, Empire Marketing Board.—Tulip bulbs from Cyprus.

London, Under Secretary of State, Foreign Office.—Fruits of *Rosa berberifolia* and *R. canina* group collected by Mr. A. C. Trott, British Legation, Tehran.

London, Forestry Commission.—Plant of fastigiate larch, and seeds of *Persea Lingue* and *Laurelia aromatica*.

London, High Commissioner for South Africa.—A large collection of South African plants.

London, Hyde Park.—Collections of plants and consignments of seeds including 184 packets from Nepal.

London, L.C.C. Parks Department.—Collection of greenhouse plants and trees and shrubs.

Lyons, Botanic Garden.—45 packets of seeds.

Montpellier, Botanic Garden.—23 packets of seeds.

Moscow, Botanic Garden.—21 packets of seeds.

New York, Botanic Garden.—Plants, *Hemerocallis* spp., etc., and a collection of seeds including *Monotropa uniflora*, *Hypopitys* sp. and *Amsonia Ludoviciana*.

Ottawa, Central Experimental Farm.—31 packets of seeds.

Peradeniya, Royal Botanic Gardens.—Collection of palm seeds.

Philadelphia, University of Pennsylvania.—Collection of Sarracenias and Darlingtonias.

Port Elizabeth, Parks & Town Attractions Department.—Plants, cuttings and seeds.

Rome, Botanic Garden.—38 packets of seeds.

Sarajevo, Botanic Gardens.—Seeds of *Sorbus florentina*.

Singapore, Botanic Garden.—Collection of plants including *Scyphostegia borneensis*, also seeds of *Rhododendron retusum* and *Senecio sumatrana*.

Sydney, Botanic Gardens.—Seeds of *Ceratopetalum gummiferum* and *Callistemon* spp.

Taschkent, Botanic Gardens.—28 packets of seeds, also a collection of bulbs of *Tulipa* spp.

Trinidad, Department of Agriculture.—Collection of plants and seeds, and pods of cacao.

Vancouver, University of British Columbia.—21 packets of seeds.

Washington, U.S. Department of Agriculture.—A varied collection of seeds, including spp. of *Quercus*.

Wellington, State Forest Service.—Seeds, including 4 spp. of *Nothofagus*.

Wisley, Royal Horticultural Society's Gardens.—Plants, including spp. of *Berberis*, and various seeds.

Private Donors :—

Mrs. N. Anderson, Southport.—A large collection of filmy ferns.

Messrs. Armstrong & Brown, Tunbridge Wells.—Plants of *Coelogyne burfordense* and *Cyrtopodium Andersonii*.

Mr. S. C. Atchley, Athens.—Bulbs of *Muscari* sp. and seeds of *Lilium Heldreichii*.

Mr. F. R. S. Balfour, Dawyck, Scotland.—Plants, including *Waldsteinia fragarioides* and *Lomaria alpina*.

Miss Winsome Barker, Bolus Herbarium, Kirstenbosch.—Plants, bulbs and seeds.

Lady Muriel Jex-Blake, Nairobi.—Seeds and cuttings of *Edithcolea grandis*.

Mr. A. C. Bourne, North Vancouver, British Columbia.—Plant and seeds of *Linnaea canadensis*, and seeds of *Hypericum anagalloides*.

Mr. J. R. Brown, California.—Plants of *Haworthia turgida* and *Apicra pentagona*.

Mr. T. R. Brown, Bombay Presidency.—Tubers of *Amorphophallus* sp.

Mr. H. Bruins-Lich, Trinidad.—Seeds and bulbs.

Mr. E. G. Bryant, Prieska, South Africa.—Collection of plants.

Col. Stephenson R. Clarke, Cuckfield.—Plants, including *Styrax dasyanthus*, *S. japonicus*, *Rhododendron Haemonium* and *Quercus Ludoviciana*.

Rt. Hon. Sir George R. Clerk, Angora.—Seeds of *Rosa foetida*.

Sir Jeremiah Colman, Bt., Gatton Park.—Orchids.

H.R.H. The Duke of Connaught, Bagshot Park.—Cuttings of *Wistaria multijuga*.

Capt. H. J. Dunne Cooke, London.—Plants and cuttings of Mesembryanthemums.

Mr. W. A. Constable, Tunbridge Wells.—Bulbs and seeds of *Lilium* spp.

Mr. G. H. Dalrymple, Bartley.—Plants of hybrid *Lobelia* and *Cytisus*, also cuttings of *Picea glauca* var. *echiniformis*.

Mr. L. Denny, Strawberry Hill, Middlesex.—10 succulent plants.

Messrs. Clarence Elliott Ltd., Stevenage.—Plants of *Calceolaria tenella* and seeds of *Paeonia Mlokosewitchii*.

Mr. L. M. Ellis, Sydney.—Seeds of a wild *Musa* from North Queensland.

Lt. Col. H. C. Elwes, Cheltenham.—Plant of *Trichodesma Boisseri*.
Dr. P. L. Giuseppi, Felixstowe.—Plants and seeds.
Mr. P. J. Greenway, Tanganyika Territory.—A collection of seeds, also tubers of an edible Labiate.
Major C. E. Gresham, Cairo.—9 packets of seeds collected on Mt. Troodos, Cyprus.
Mr. S. H. Griffin, Farnham.—Collection of succulents.
Mr. E. R. Guest, Wimbledon.—Seeds, rhizomes and bulbs collected in Iraq.
Mr. A. Haggard, Ledbury.—Collection of orchids from Sao Paulo, Brazil.
Mr. Cecil Hanbury, La Mortola.—A large collection of seeds, also a consignment of bulbs of *Lilium candidum*.
Mr. F. J. Hanbury, East Grinstead.—Plants of *Lomaria pumila*, *Draba rupestris* and *Mimulus* species.
Miss T. J. Harris, Sydney.—50 packets of seeds, also a collection of ferns in excellent condition.
Messrs. T. R. Hayes & Sons, Ambleside.—Collection of plants comprising species and varieties of *Erica*, *Calluna*, *Helianthemum*, *Juniperus* and *Pinus*.
Mrs. C. Holmes, Hitchin.—A large collection of Cacti and other succulents.
Admiral A. G. Hotham, London.—Plant of an apricot-coloured *Bougainvillea* from Jamaica.
Mr. A. W. van den Houten, Capetown.—A collection of *Aloë* spp.
Dr. John S. Hudson, London.—Plant of *Tillandsia dianthoides*.
Capt. H. A. Johnstone, London.—Palm seeds, including *Adonidia Merrillii*.
Major L. Johnston, Campden.—Plants, including *Penstemon barbatus* var. *Torreyi* and *Clematis Forrestii*.
Mr. P. N. Kohli, Kashmir.—Bulbs and seeds of *Tulipa* spp.
Mr. C. H. Lankester, Costa Rica.—Plants, principally orchids, and miscellaneous seeds.
Mr. H. Q. Levy, Jamaica.—A collection of orchids.
Dr. J. Luckhoff, Cape Town.—A valuable collection of *Mesembryanthemum* spp. and other S. African succulents.
Mr. R. H. Macaulay, Argyll.—*Myrtus nummularia*, *Hydrangea hortensis* var. *stellata*, and *Cyananthus incanus* var. *leiocalyx*.
The Hon. H. D. McLaren, Bodnant.—Grafts of *Rhododendron spinuliferum* x *R. moupinense*, also a large number of seeds, including a consignment collected in China by Forrest's native collectors.
Col. R. Meinertzhagen, London.—Bulbs of *Tulipa* sp., from the top of Mt. Lebanon; 14 packets of seeds from the garden of H.M. The King of Bulgaria, also seeds of *Sonchus palustris*.
Mr. F. W. Millard, East Grinstead.—Plants of *Pernettya tasmanica*.
Mr. H. Armytage Moore, Co. Down.—Rhododendrons, and seeds of *Ranunculus Lyallii* and *Meconopsis superba*.
Mr. C. T. Musgrave, Hascombe.—Plants and seeds.

Messrs. W. T. & H. E. Neale, Newhaven.—Collection of Cacti.

Mr. J. Nitzan, Palestine.—5 succulent plants, including one exceedingly good specimen of *Echinopsis gemmatus*; bulbs of *Pancratium maritimum* and seeds of *Agave sisalana*.

Mr. Kennedy North, London.—A collection of succulents, and 8 packets of seeds.

Major A. Pam, Broxbourne.—Valuable collection of bulbs, including *Fritillaria libanotica*, corms and tubers, and seeds of *Ferraria undulata*.

Major P. Peckell, Odiham.—Orchids.

Mr. D. Pringle, Port Elizabeth, South Africa.—Stapeliads

Dr. R. H. Pulleine, South Australia.—Cuttings of 5 species of *Euphorbia* and 48 packets of seeds, including *Carpobrotus aequilateralis*.

Sir John Ramsden, Bt., Gerrards Cross.—Plants of *Rhododendron* spp.

Lady D. Rendlesham, Falmouth.—*Echinops* sp., *Aloe*, etc.

Mr. G. A. Rock, Kingston, Jamaica.—*Ionopsis utricularioides*, *Broughtonia sanguinea* and spp. of *Oncidium*.

Mr. C. Gilbert Rogers, Nairobi.—Seeds of *Delphinium*, *Protea*, *Lobelia* and *Hypericum* spp., etc.

Major Lionel de Rothschild, Exbury.—*Callicarpa rubella* and a collection of *Pernettyas*.

Hon. Mrs. E. Ryder, Beaulieu.—Plants, including a collection of Proteas and Leucadendrons, and miscellaneous seeds.

Mrs. W. H. St. Quintin, Malton.—A collection of plants of *Orchis* and *Serapias* spp.

Mr. W. A. Schipp, British Honduras.—Two large consignments of plants, also seeds.

Mr. F. W. Schumacher, Jamaica Plain.—Seeds of *Rhododendron* species and varieties.

Mr. A. E. Seaward, Romford.—Hybrid *Cattleyas*.

Mr. H. B. Sharpe, Kenya.—Seeds collected in the Tana River district.

Mr. C. J. Sibbett, Cape Town.—10 packets of seeds.

Mr. B. W. Slavin, City of Rochester, U.S.A.—A particularly interesting collection of conifers and shrubs, including *Picea Abies* var. *Maxwellii* (true) also varieties of *Pinus* new to British Gardens.

Major A. A. Dorrien Smith, Tresco Abbey.—Plants and seeds.

Prof. N. J. G. Smith, Grahamstown.—18 succulent plants, and seeds of *Welwitschia mirabilis*.

Mr. J. E. Spingarn, New York.—Seeds of *Clematis* spp.

Miss D. B. Stafford, Enfield.—Bulbs and plants from Peru.

Lady Beatrix Stanley, Madras.—Seeds of *Klugia notoniana* and *Didymocarpus tomentosus*.

Miss E. Stephens, Cape Town.—*Utricularia capensis*, sent in original soil from Table Mountain.

Mr. J. E. H. Stooke, Hereford.—*Lilium* seeds and seedlings.
H.R.H. The Crown Prince of Sweden.—Plants of *Cassiope hypnoides* and *Linnaea borealis*.
Mr. W. G. Theobald, Steyning.—Succulents.
Mr. J. N. Thorncroft, Barberton, Transvaal.—A collection of seeds.
Dr. A. M. Vollmer, San Francisco.—Bulbs and seeds of *Lilium* spp.
Mr. John Vorres, Athens.—Seeds, including *Chimonanthus fragrans*.
Dr. A. Wade, London.—Palm seeds from the Great Valley of Madagascar.
Mr. F. A. Weinthal, New South Wales.—A collection of orchids and 4 packets of miscellaneous seeds.
The Allan C. White & Boyde L. Sloane Stapelia Collection, California.—Collection comprising 50 Stapeliads.
Messrs. K. Yashiroda Ltd., Japan.—Seeds from Formosan Expedition and plants of *Rhododendron chrysanthum*.
Mr. R. G. N. Young, S. Rhodesia.—17 packets of bulbs and seeds collected in north-eastern Angola and Belgian Congo.

Distribution of Plants and Seeds.—The usual distribution of seeds was made in the early part of the year and comprised 172 consignments, made up of 5900 packets of herbaceous plants and 4244 packets of trees and shrubs, an aggregate increase of 353 packets over the previous year's totals.

Seeds of subjects of particular interest specially distributed were *Gentiana crinata*, *Pernettya* sp. from Hobart, *Aesculus indica*, *Aesculus californica*, and *Rosa persica* (synonymous with *Rosa berberifolia*), whilst economic subjects procured for distribution within the Empire included species and varieties of *Pyrethrum*, *Cyphomandra*, *Chenopodium*, *Sorghum*, *Artemisia*, *Musa*, *Astragalus*, *Stylosanthes*, *Caesalpinia*, *Alysicarpus*, *Cenchrus*, *Digitaria*, *Trifolium*, millet, oats, rye, chillies, cucumber, onion, sisal and tung oil.

Overseas shipments of plants, for which Wardian cases were used in some instances, were despatched to Government House, Madras ; Hobart, Tasmania ; Department of Agriculture, Madras ; Penang ; Queens Park, Western Australia ; Botanic Gardens, Dunedin ; Botanic Gardens, Peradeniya and Cape Town. In addition, consignments of banana suckers raised at Kew from material collected in various parts of the world were sent to Trinidad (see p. 4) ; offsets of *Agave* species received from La Mortola were sent to Tanganyika ; orchids from Trinidad were reshipped to India ; Wardian cases of cacao seedlings from Trinidad and pineapple slips from Porto Rico were forwarded to Nigeria. Further distributions of plants raised at Kew of the seedless variety of pomegranate, referred to in the "Review" for 1932, were made to British dominions.

Other recipients of plants, etc., from Kew included the following :—

Aberystwyth, Imperial Bureau of Plant Genetics.—Seeds of *Trigonella Foenum-graecum.*

Aberystwyth, Welsh Plant Breeding Station.—Plants of *Cynodon Dactylon, Melinis minutiflora* var. *inermis,* also seeds of *Eleusine indica, Bromus unioloides* and *Bromus marginatus.*

Angora, British Embassy Gardens.—A collection of seeds of herbaceous plants and flowering shrubs.

Baarn, Cantonspark.—Collection of alpine plants.

Bangor, University College of North Wales.—Plants and cuttings of economic subjects.

Belfast, Parks Department.—Seeds of *Victoria regia.*

Berkeley, University of California.—A collection of seeds comprising 21 species and varieties of *Antirrhinum.*

Bermuda, Department of Agriculture.—A collection of bulbs and seeds of *Lilium* species.

Bristol University, Department of Botany.—Seeds of *Clerodendron Thomsonae* and *Cleome spinosa,* also cuttings of 4 species of *Pavetta.*

Brooklyn, Botanic Garden.—Seeds of *Clematis* species.

Brussels, Botanic Gardens.—A collection of plants exhibited by Kew at Ghent Floralies.

Budapest, Royal Hungarian Horticultural College.—Plants of *Caltha, Gymnogramme* and *Dicksonia* spp., also spores of *Dicksonia antarctica.*

Cambridge University Botanic Garden.—Plants, seeds and cuttings.

Coimbatore, Government Sugarcane Expert.—Seeds of *Sorghum* spp., etc.

Copenhagen, Botanic Garden.—Seeds of 12 species of *Acer.*

Cyprus, Department of Agriculture.—Plants of seedless pomegranate, also seeds of *Caesalpinia spinosa.*

Durban, Parks and Gardens Department.—Seeds of *Victoria regia.*

Edinburgh, Royal Botanic Garden.—Plants (including a collection of spp. of *Sarracenia* and *Pinguicula*), seeds and cuttings.

London, Hyde Park.—Seedlings of *Meconopsis grandis.*

Gibraltar, Government House.—Bulbs of *Hippeastrum, Tritonia* and *Zephyranthes.*

Glasgow, Parks Department.—Seedlings of 8 species of *Streptocarpus* and seeds of *Cycas Wadei* and *Coffea stenophylla.*

Glasnevin, Botanic Gardens.—Plants, seeds and cuttings.

Gothenburg, Botanic Garden.—Plants of *Disa tripetaloides* and *Disa Luna.*

John Innes Horticultural Institution, Merton.—Plants, seeds and cuttings.

Kenya, Department of Agriculture.—Plants of scented Pelargoniums for essential oil trials.

Kiel, Botanic Garden.—Plants of *Senecio* (*Kleinia*) *stapeliiformis.*

Kirstenbosch, National Botanic Gardens.—Plants, including seedless pomegranate and *Artemisia Dracunculus*, also seeds of *Cicuta virosa* and *Anethum graveolens*.

Kornik, Poland.—A collection of cuttings comprising species of *Larix, Picea, Taxus, Betula, Carpinus, Celastrus, Cladrastis, Cornus, Maackia* and *Robinia*, also 20 packets of seeds of flowering shrubs.

Leicester, Museum and Art Gallery.—A collection of Cacti and other succulents.

Leningrad, Academy of Agricultural Science.—Seeds of *Melilotus albus, M. indicus* and *M. italicus*.

Lisle, U.S.A., Morton Arboretum.—Acorns of 5 species of *Quercus*.

London, Forestry Commission.—Collection of trees and shrubs, also water lily plants.

London, Passenger Transport Board.—Cuttings of decorative shrubs.

London, Regents Park.—A collection of plants and seedlings of alpine subjects.

Madras, Agri-Horticultural Society.—Seeds of *Nelumbo nucifera*.

Malta, Imperial War Graves Commission.—Seeds of *Arctotis, Ursinia*, and *Dimorphotheca* spp.

Mauritius, Department of Agriculture.—Seed of *Erianthus ravennae*

Montreal, McGill University.—Seeds of species of *Sorghum, Vetiveria, Capillipedium*, and *Chrysopogon*.

Moscow, Institute of Forest Culture and Forest Melioration.—Cuttings of *Populus* and *Salix* species.

Müncheberg, Kaiser Wilhelm Institut für Züchtungsforschung.—A collection of cuttings of *Pelargonium* species.

Nigeria, Assistant Surveyor General.—Seeds and plants of economic subjects.

Oxford, Botanic Garden.—Plants of *Gleichenia* and *Verbena* spp.

Palestine, Director of Agriculture and Forests.—Seeds of *Caesalpinia spinosa* and *Pycnostachys Dawei*, also plants of *Aloë Dawei, Kalanchoë Dawei* and *Clerodendron ugandense*.

Philadelphia, University of Pennsylvania.—A collection of insectivorous plants comprising species of *Drosera, Cephalotus* and *Pinguicula*.

Salford, Parks Department.—Plants and seeds.

Sierra Leone, Department of Agriculture.—*Citrus* grafts.

Swanley, The Horticultural College.—A collection of plants of *Dianthus* species.

Swansea, Parks Department.—Seeds of gourds.

Washington, Department of Agriculture.—Seeds of *Phoenix reclinata, P. farinifera, P. abyssinica* and *P. humilis*.

Wisley, Royal Horticultural Society's Gardens.—Collections of plants, cuttings and seeds.

Wye, South-Eastern Agricultural College.—Plants—mixed herbaceous and a collection of Dahlias, also seeds of *Alstroemeria* and *Jatropha*.

Yochow, Province of Hunan, Agricultural Experimental Station.—Seeds of economic plants.

Sir Francis Dyke Acland, Bt., Broadclyst.—A collection of trees and shrubs.

Mr. B. C. Aston, Wellington, New Zealand.—Seeds of medicinal plants.

Mr. S. C. Atchley, Athens.—Bulbs of *Hyacinthus, Narcissus, Muscari, Cyclamen* and *Tulipa* species.

H.E. Ambassador Assis Brasil, Brazil.—A collection of grafts of pendulous trees and shrubs.

Sir Jeremiah Colman, Bt., Gatton Park.—Plants, including orchids.

Mr. W. A. Constable, Tunbridge Wells.—Seeds of *Lilium* species.

Capt. H. J. Dunne Cooke, London.—Plants of *Mesembryanthemum* species.

Mr. G. H. Dalrymple, Bartley.—Plants and cuttings of dwarf conifers.

Mr. J. Davis, Belmore, N.S.W.—A collection of fern spores.

Messrs. Clarence Elliott Ltd., Stevenage.—Plant of *Centaurium confertum*.

Lt. Col. H. C. Elwes, Cheltenham.—Plant of *Cyrtanthus obliqua*.

Dr. P. L. Giuseppi, Felixstowe.—Plants, including *Oresitrophe rupifraga* and *Celsia bugulifolia*.

Col. C. H. Grey, Cranbrook, Kent.—Plants, including *Pratia angulata, P. Treadmanii* and *Claytonia australasica*.

Mr. S. H. Griffin, Farnham.—Collection of Cacti.

Mr. Cecil Hanbury, La Mortola.—Plants, seeds and bulbs.

Mr. F. J. Hanbury, Brockhurst.—Plants, including *Saxifraga stellaris*.

Messrs. Hillier & Sons, Winchester.—Plants, grafts and seeds.

H.M. The King, Windsor Castle.—Plants of *Cornus Kousa* var. *chinensis*.

Knap Hill Nursery Ltd., Woking.—Plants, cuttings and seeds.

Sir Wm. Lawrence, Bt., Dorking.—Plants and seeds of *Victoria regia* var. *Trickeri*.

Mr. H. Q. Levy, Jamaica.—Orchids.

Mr. R. H. Macaulay, Argyll.—Plants, including a collection of Rhododendrons.

Hon. H. D. McLaren, Bodnant.—Plants and seeds.

Mr. F. W. Millard, East Grinstead.—Plants and seeds.

Mr. H. Armytage Moore, Co. Down.—Plants of *Acer, Berberis* and *Rhododendron* species.

Mr. C. T. Musgrave, Hascombe.—Plants, cuttings and seeds.

Messrs. W. T. & H. E. Neale, Newhaven.—Collection of Cacti.

Mr. Kennedy North, London.—Plants, including *Gunnera Hamiltonii*.
Major A. Pam, Broxbourne.—Stove plants and shrubs.
Dr. von Poellnitz, Altenburg, Germany.—Collection of succulents.
Major Lionel de Rothschild, Exbury.—Plants and seeds.
Messrs. Rowntree & Co. Ltd., York.—Plants of *Vanilla planifolia* and *Hevea brasiliensis*.
Hon. Mrs. E. Ryder, Beaulieu.—Plants, seeds and bulbs.
Mr. A. E. Seaward, Romford.—Plants of 4 species of *Euphorbia* and *Chamaedorea elatior*.
Mr. F. W. Schumacher, Jamaica Plain.—Seeds of species and varieties of *Rhododendron*.
Mr. C. J. Sibbett, Cape Town.—Seeds of *Lilium regale*, *Humea elegans*, and *Aesculus californica*.
Mr. Boyd L. Sloane, California.—Plants of *Stapelia*, *Duvalia* and *Huernia* species.
Messrs. W. C. Slocock Ltd., Woking.—Plants, cuttings and seeds.
Major A. A. Dorrien-Smith, Tresco Abbey.—Plants, including *Manettia inflata*, seedlings and seeds.
Messrs. C. Smith & Son, Guernsey.—Plants of *Camellia* species.
Mr. H. J. Solomon, Sydney, N.S.W.—A small collection of ornamental plants.
Mr. J. E. H. Stooke, Hereford.—Seeds of *Lilium* species also *Nomocharis*.
Mr. W. G. Theobald, Steyning.—Plants of three species of *Cotyledon*.
Dr. A. M. Vollmer, San Francisco.—Seeds of *Lilium* species.
Mr. F. A. Weinthal, New South Wales.—A collection of orchids.
Miss E. Willmott, Great Warley.—Plants of *Bignonia capreolata*.
Messrs. K. Yashiroda Ltd., Japan.—A collection of seeds including *Lilium formosanum* "Price's var."

Bedgebury.

Conditions have, on the whole, been favourable for the development of young trees, though a number of losses have occurred, chiefly through fungus diseases.

The young shoots of a few trees were injured by late spring frosts, but less severely than during the earlier years of the Pinetum. Many of the more vigorous trees are getting above the serious frost line, and smaller subjects are benefiting from the shelter built up by self-sown pine trees, ling and other shelter that has been developed.

Although the year has been abnormally dry nothing suffered from drought and the only plants watered were a few large Rhododendrons that were planted in March. Ground vegetation appeared to have a good effect by shielding the surface roots of the young trees from the bright sun. That the ground dried very considerably is seen from the fact that in late December most of the springs,

watercourses, and drains were still dry. The spring from which water is obtained for Park House continued to function throughout the year, but the well on the hill near the pine avenue dried up in summer and was still empty in December. The brook running from the Sequoias to Marshall's lake dried up in summer and was still dry in December, and the other main stream running from the Cupressus to Marshall's lake was so sluggish in December that the surface was covered with thick ice.

Bitterly cold east and north winds accompanied by frost were experienced in early December and shelter had to be built round a number of semi-tender species. Marshall's lake was used by skaters for ten days previous to December 20th, when a thaw occurred. Very variable night temperatures have been recorded from different parts of the Pinetum, the temperature in low, wet places often falling 4–6 degrees lower than at higher elevations a short distance away. On the morning of December 10th 27 degrees of frost were registered on the ground in a low place near Marshall's lake, and on the same morning the minimum screen temperature on higher ground registered only 15 degrees of frost. Abnormally high temperatures were not recorded during summer though the average temperature was higher than usual. Very often higher temperatures were recorded on the lower than the higher ground.

A number of losses have occurred through honey fungus (*Armillaria mellea*), and it appears that such losses may continue, for the old tree stumps left in the ground are very badly infested by the fungus and it easily spreads to living trees. Unfortunately, there does not appear to be any practical means of dealing with this disease. Losses amongst fine-leaved pines have occurred through Weymouth pine rust (*Cronartium ribicola*), and it appears possible that plants already affected by the disease may have been planted.

Insect pests have been less troublesome than usual, though several are still present and a constant watch has to be kept on susceptible plants. Some hand-picking for larvae of pine-shoot Tortrix has been necessary.

Some additional planting was carried out in March, notably a large number of *Rhododendron* spp. from Kew, and a collection of Chinese species generously presented by Sir John Stirling Maxwell, Bt., K.T. A number of conifers required to make up for losses was also planted.

The drought necessitated constant patrol of the ground during week-ends in case of fire, but fortunately the danger period passed without an outbreak. As undergrowth was everywhere very dry general mowing was begun early and completed before the end of November.

Park House was brought under the control of the Forestry Commission during the year and is now occupied by their Forester. A person in authority, who can act in times of emergency, is therefore

now living in the Pinetum, which is much better than the previous arrangement. Accommodation is being made in Park House for a small herbarium for the use of students and as a workroom for anyone visiting the Pinetum. The ground round Park House has been added to the Pinetum and will be planted with interesting trees and shrubs. At present it is being worked and cleaned ready for planting.

New work in the Pinetum has hitherto been held up by lack of labour and has only been done by neglecting necessary work in other directions. Temporary fences and bridges are all in need of repair or replacement by more permanent structures. A small increase in the annual grant has now been sanctioned by the Treasury, and it is hoped to carry out some of these improvements during the coming year.

The time has arrived when a good deal of careful pruning is required by large-growing trees, such as *Larix*, *Pseudotsuga*, *Pinus*, etc. When trees are planted wide apart there is a very definite tendency for every branch to develop, and unless this is counteracted, the trees will produce heavy branches from the ground upwards, and height will suffer. The practice to be followed is to clear the lower parts of the trunk to a moderate height at the rate of 9–12 in. a year, at the same time thinning out some of the higher branches where they are growing close together. It is hoped, by careful attention to pruning while the trees are young, to secure a clean, well-developed section of trunk surmounted by a shapely head of branches. A tree of each species with branches easily reached from the ground will be left, in order that the leaf system may be examined by students.

The Museums.

The year has been uneventful so far as the Museums are concerned. Much of the work has been answering the questions of correspondents and visitors, questions that appear to become more numerous and varied year by year. As recorded last year, colonial farmers are very concerned as to suitable crops to add to those they already produce, or to take the place of those that are not a commercial success. Such questions are difficult to answer in these days of over-production, for an additional acreage planted with some hitherto remunerative crop may result in such a serious reduction of price that it cannot be produced at a profit. Some success appears to be following the more extended cultivation of essential oil-yielding plants in East Africa.

The collection of lily bulbs, alluded to in last year's report, was added to and exhibited at the Lily Conference held by the Royal Horticultural Society in July. The preserved bulbs together with a collection of capsules and seeds were afterwards exhibited for some months in Museum no. 4.

Additional specimens of trees and shrubs have been dried, mounted, and added to the arboretum herbarium, and a start has been made in the preparation of an herbarium collection of drug plants.

The greater part of Museum no. 4 (British forestry), with the museum offices, has been redecorated. The skylight in Museum no. 2, which has given trouble for many years, has been rebuilt, and some much-needed repair has been effected to the roof timbers of Museum no. 3. This work entailed a good deal of labour in the removal and rearrangement of specimens.

During the year Mr. J. H. Turner contributed an article to the "Kew Bulletin" on "The Viability of Seeds," in which he described, amongst other instances, how seeds that had been stored in museum jars for periods varying from 43 to 90 years had germinated and produced plants. Mr. F. N. Howes contributed an article on "Variability in Stock-poison Plants."

The Keeper has been President for the year of the Society of Foresters of Great Britain and in that capacity attended the annual meeting of the society in Scotland in May. He also read a paper on "Trees and the Countryside" before the Forestry Subsection of the British Association at Leicester in September. He has continued to act as Executive Officer for the Pinetum at Bedgebury.

Duplicate museum specimens have been distributed to Mr. W. H. Davis, Hockley, Birmingham; Mr. Alan Gardiner, Perce Neige, Chateau D'Oex, Switzerland; Mr. A. L. Hills, Redleaf Estate Office, Penshurst Station, Kent; Mr. E. J. Moore, Birmingham Central Technical College; Mr. F. H. Pierpont, Oakfields, Salfords, Redhill, Surrey; Professor Record, Yale University; Mr. T. Roberts, Bellings, Midhurst, Sussex; M. le Dr. F. Stockmans, Musée Royal d'Histoire Naturelle de Belgique, Bruxelles; Mr. A. L. Thomas, Tonbridge School; Mr. G. Fox Wilson, Department of Entomology, Royal Horticultural Society's Laboratories, Wisley.

Presentations to Museums.—Australia, Commonwealth of, Australia House, Strand.—Eight planks of Tasmanian timbers.

Mr. E. K. Balls, "Terem," Oakfields, Knebworth, Herts.—Four samples of Turkish hazelnuts.

British Museum, Department of British and Mediaeval Antiquities.—Section of wood enclosing iron chain, said to be part of the Wellington Elm from the field of Waterloo.

Messrs. Chivers & Sons Ltd., Histon, Cambridge.—Twelve bottles of preserved fruits.

Mr. A. T. Curle, 6 Learmouth Road, Edinburgh.—Sample of "dunkal gum" (*Commiphora Drake-Brockmanii*) from British Somaliland.

Mr. John Dean, "Seascape," 572 Head Street, Esquimalt, Victoria, B.C.—Photographs of *Cornus Nuttallii* and *Spiraea discolor*.

Dr. H. E. Durham, Dunelm, Hereford.—Fourteen photographs of mistletoe and its hosts.

Mr. J. E. Edwards, Government House, Gibraltar.—Cone of *Araucaria Cookii*.

Messrs. W. G. Fitzgerald, Ltd., 199 Blackshaw Road, Tooting.—Specimen of zebrano wood.

Dr. Wilfred Fox, Roads Beautifying Association, 7 Buckingham Palace Gardens, S.W. 1.—Two photographs of a large pyramidal tree of *Quercus sessiliflora*.

Dr. H. Frankfurt, 7 Canon Place, Hampstead.—Sample of wood from Palace of Sargon, Assyria, 722–705 B.C.

Messrs. Gabriel, Wade & English Ltd., Wisbech.—Aspen log and veneer.

Mr. E. R. Guest (late Inspecting Officer of Agriculture, Central Experimental Farm, Rustam, Baghdad), Wimbledon.—Seeds of *Lallemantia iberica*.

Mr. J. H. Holland, Museums, Kew.—Thirteen photographs of the Botanic Gardens, Calabar, and two samples of totaquina powder.

Mr. J. E. Hughes, P.O. Box 51, Port Elizabeth, South Africa.—Specimen of wood of *Amblygonocarpus obtusangulus*.

The Director, Imperial Institute, South Kensington.—Sample of fibre of *Agave amaniensis*.

Miss M. H. James, 75 Charlwood Street, S.W. 1.—Sample of hyree leaves (*Albizzia amara*).

Miss M. S. Johnston, 276 Kew Road, Kew.—Corn-cob pipe, ornament made from cactus stem, bowl of juniper wood and various photographs.

Messrs. J. Carter Jonas & Sons, 8 Suffolk Street, Pall Mall East, S.W. 1.—Section of trunk of tree of *Pinus Lambertiana*.

Mr. G. Bowes Loddiges, 6 Baronsmead Road, Barnes.—Collection of about 600 small hand specimens of woods.

Prof. P. E. Newberry, Oldbury Place, Ightham, Kent.—Specimen of barley from King Toser's Pyramid, Saggara, 2980 B.C.

Mr. U. S. Parry, Baghmara.—Wood of *Aquilaria Agallocha*.

Mr. F. H. Pierpont, The Monotype Corporation Ltd., Redhill, Surrey.—Piece of basong root (*Alstonia spathulata*).

Mr. M. E. Weatherall, La Trelade, St. Martins, Guernsey.—Twelve photographs of *Pinus Bungeana*.

Mr. E. J. Wortley, Director of Agriculture, British Guiana.—Samples of nutmegs.

Jodrell Laboratory.

The routine work of the laboratory has as usual been mainly concerned with the identification of miscellaneous botanical material from a study of its anatomy. The chief classes of material dealt with were timbers, barks, fibres, herbaceous stems, leaves, and seeds. Some idea of the very varying nature of the enquiries may be gained when it is mentioned that they included seven samples

of variously painted hairbrush-backs, which were found to be made of *Liquidambar styraciflua* ; samples of crushed mint leaves which were adulterated with *Ailanthus glandulosa* (tree of heaven) ; and a compact mass of adventitious roots from Africa (alleged to be used for tanning), which belonged to a species of *Vellozia* (*Amaryllidaceae*). In addition, discussions were held with a Chemist from the Government Laboratory concerning the anatomy of tobacco with a view to the detection of adulterants.

A special investigation on the structure of sandal and other scented woods from various parts of the world has been in progress throughout the year, and it is hoped that an illustrated account of this work will be ready for publication during 1934.

In connexion with the experimental work at Potterne under the direction of Mr. Marsden-Jones and Dr. Turrill, the work on the anatomy of *Centaurea*, mentioned in the report for 1932, has been continued. Unfortunately the results obtained by examining material collected in 1932 and 1933 did not entirely agree. The work, however, is being continued, and it is hoped that an explanation of the discrepancies will be found. Work on the anatomy of the flowers and capitula of *Centaurea* has also been started. An investigation of the embryology of bulbil- and non-bulbil-producing forms of *Ranunculus Ficaria* is in progress in collaboration with Mr. Marsden-Jones.

The number of visitors to the laboratory has been larger than usual, and some have worked for prolonged periods. Special mention may be made of the valuable help given by Mr. E. R. Goodliffe, who carried out a month's intensive work in connexion with the investigation of the anatomy of *Centaurea*, and Mr. B. A. Jay, who assisted by germinating orchid seeds on sterilized culture media, and by making a special study of the structure of some oil-yielding Lauraceous woods from the Federated Malay States. The following is a list of other visitors who worked at the laboratory during the year :—

Miss C. L. Perry. Anatomy of the *Acanthaceae*.
Miss M. R. F. Taylor. Diseases of lilies.
Miss M. E. Lott. Mycology.
Miss M. A. Madge. Fixing cytological material.
Mr. L. A. Boodle. Material excavated from the Egyptian tombs.
Mr. W. R. Philipson. Anatomy of *Agrostis*.
M. Simonet. Fixing cytological material of *Iris*.

Visitors from the John Innes Horticultural Research Station made use of the laboratory on various occasions to fix material for cytological work.

The Herbarium.

The final adjustments and labelling following the opening of the new wing were completed during the year. The most important additional alteration was the re-arrangement of the collection of drawings so as to bring them as near as possible to the specimens.

Owing to the discovery of a fracture in one of the beams in the floor of the Library over the Keeper's room, it was necessary to replace this and another beam with iron girders. Considering the building has been in existence since the middle of the eighteenth century and was only designed as a dwelling-house, it is understandable that the great weight of books should have proved too great a strain for the old flooring. An historical account of the herbarium building will be found in the " Kew Bulletin " for 1891, p. 314.

Europe, North Africa, and the Orient.

The year 1933 has been remarkable in this department on account of the number of specimens received for incorporation in the Herbarium. 24,204 numbers (sometimes a single number needing 2 or 3 sheets in mounting) have been presented or purchased. This figure includes 14,363 received for identification or verification, apart from single specimens or small packets sent by correspondents. 11,602 sheets have been mounted and approximately the same number laid in.

Owing to the time involved in identification of new material, very few genera have been newly ' written up ' in the Herbarium, but *Hypericum*, *Marrubium*, and *Clypeola* have been re-arranged and the sheets geographically sorted.

A noteworthy addition to the British collections was the valuable herbarium of Mr. C. E. Britton, presented by him early in the year. This is particularly rich in varieties and forms of British species, and the Exchange Club specimens it contains will fill many gaps. Mr. Britton is continuing to present additional material, much of which he has critically investigated himself. Other contributors of British material include Mr. W. C. Barton, Dr. R. W. Butcher, Miss M. E. Edmonds, Mr. P. M. Hall, Col. H. H. Johnston, Rev. H. J. Riddelsdell, Mrs. C. I. Sandwith, Mr. W. T. Stearn, Mr. H. F. Tresadern, Mrs. M. L. Wedgwood, Miss I. Wright (coll. Rev. Lawson Sant Wright), Mr. H. Stuart Thompson, the Botanical Society and Exchange Club of the British Isles, and members of the Kew staff. In addition special mention should be made of a set of 627 specimens collected between 1890–1900 by the late Mr. A. B. Sampson, presented by his son, Mr. H. C. Sampson ; 186 specimens from J. Ralfs' herbarium presented by Mr. H. J. Goddard ; 94 sheets of elms from Cornwall collected by Mr. L. T. Medlin and received through Mr. E. Thurston ; and a further instalment of over 100 numbers of Alderney plants collected by Messrs. A. Bruce Jackson and H. K. Airy-Shaw.

From the Balkan Peninsula the following important contributions (totalling over 1700 numbers) have been received during 1933 : from Greece (Mr. S. C. Atchley), Bosnia, Dalmatia, and S. Croatia (Mr. B. Gilliat-Smith), Bosnia (Dr. K. Maly), Thrace and S. Macedonia (Mr. H. G. Tedd), Bulgaria (Rev. & Mrs. H. P. Thompson, and Mr. B. Stefanoff), Bulgaria and the Dobruja (Dr. T. Wiśniewski).

In addition Mr. A. H. G. Alston (of the British Museum, Natural History) and Mr. N. Y. Sandwith (of Kew) spent some weeks making a botanical exploration of southern Albania. Their beautifully prepared material, consisting of 1040 numbers (not included in the figure at the beginning of this paragraph), has been shared between the British Museum and Kew and will greatly enrich the Herbarium.

Important sets of plants from Scandinavia have been received from Miss I. Wright (coll. Rev. Lawson Sant Wright), Mr. J. W. Wyatt, and the Riksmuseum, Stockholm (*Salix*). Mr. S. C. Atchley has presented 840 sheets of plants collected by him in Portugal and Spain. Mr. J. E. Lousley has given a valuable set of 1549 European plants, mainly collected by well-known botanists in Central Europe. Prof. E. B. Babcock has sent 48 specimens of critically determined species of the genus *Crepis*. Miss I. Wright made a valuable contribution of 513 sheets of plants collected by her father, Mr. Chas. A. Wright, in the Maltese Islands, and also presented a set of specimens collected by the Rev. Lawson Sant Wright in Switzerland. Mrs. J. S. Gamble presented 437 named plants collected by the late Mr. J. S. Gamble in Switzerland. A small collection of Pyrenean plants was received from Col. R. Meinertzhagen.

The following collections have also been received from various parts of Europe :—*Presented* : Czechoslovakia, Flora Exsiccata Reipublicae Bohemicae Slovenicae, cent. viii, by the Masaryk University, Brno ; Hungary, Flora Hungarica Exsiccata, cents. ix and x, by the Hungarian National Museum ; Roumania, Flora Romaniae Exsiccata, cent. xi, by the Cluj University. *Purchased* : Mr. J. Rohlena, Plantae Balcanicae (Montenegrinae) Exsiccatae, series 1 and 2 ; Mr. T. O. Weigel, Tiliae Exsiccatae Criticae, by J. Wagner, fascs. 3 and 4.

From farther east Mr. A. Syngrassides has sent very useful collections from Cyprus ; Mr. E. K. Balls, Dr. W. B. Gourlay, and Miss O. Tufnell from Asia Minor ; Mr. G. W. Furlonge from Arabia ; Mr. E. R. Guest from Iraq ; and Mr. A. C. Trott from Persia. From Egypt large numbers of specimens have been received from the Ministry of Agriculture, Botanical and Plant Breeding Section and the Horticultural Section. Mr. A. W. Trethewy has presented well-dried sets of plants from Morocco and the Canary Islands.

Research and Publications.—Mr. W. R. Philipson, with the aid of a grant from the Department of Scientific and Industrial Research, is engaged in preparing a revision of the British species of *Agrostis*, making an intensive study of both dried material and numerous strains grown in the herbarium experimental ground.

Silene subconica and S. juvenalis (K.B. 1933, 40).

A New Pyrethrum (K.B. 1933, 44).

Variation in Glaucium (K.B. 1933, 174).

Some Notes on the Troodos Pine of Cyprus, by A. Foggie (K.B. 1933, 228).

On the Flora of the Nearer East : XIV (K.B. 1933, 232).

Two Plants New to the Cyprus Flora (K.B. 1933, 407).

The Flora of Leicestershire (Oxford, 1933).

Fritillaria glauco-viridis Turrill (Gard. Chron. ser. 3, **93,** 334 ; 1933).

Asia.

China, Japan and Northern Asia.—6000 sheets were mounted during the year and all the outstanding named Chinese specimens, amounting in all to more than 9000 sheets, have been laid in.

Among the collections received during the year, special mention may be made of a set of nearly 800 duplicate specimens of plants collected by the native collectors of the late Mr. George Forrest, presented by the Hon. H. D. McLaren. This collection is being named at the Royal Botanic Garden, Edinburgh, whence a list of determinations will be received later. Another valuable donation consisted of 189 specimens of *Euphorbiaceae* received from Mr. H. C. Sampson. These formed part of the Chinese herbarium of his uncle, the late Mr. Theophilus Sampson, and were probably collected between the years 1880–1889.

The following collections were also received : a duplicate set of named specimens collected by Mr. J. F. Rock, presented by the Arnold Arboretum, Harvard University ; a collection of named specimens collected in Szechuan, Chekiang and Kiangsu, received from the Science Society of China, presented by the Bentham-Moxon Trustees ; a large number of named specimens collected mainly during the third Hainan Expedition, purchased from the Lingnan University, Canton ; a set of named specimens collected by Mr. Y. Tsiang and others in Kweichow and Shangtung, presented by the University of Nanking ; a number of named and unnamed specimens collected by Mr. J. F. Rock and others, given by the United States National Museum, Washington, and a few rare species collected by Mr. E. J. Lipschitz in the Pamirs sent from the Herbarium of the Botanical Institute of the First State University of Moscow.

The gentians collected by Capt. F. Kingdon Ward on the frontier of Burma and Tibet in 1930–31 have been sent on loan to Kew for identification, by the authorities of the British Museum, who also afforded Kew the opportunity of describing new species of *Cyananthus* from Nepal.

A large amount of critical garden material received during the year has been named, and several new species and varieties were described. A considerable number of types have been sent on loan to monographers. The critical identification and checking of the specimens of the *Labiatae* for the proposed " Flora of Fukien " by Dr. F. P. Metcalf was also carried out. Mr. K. Yashiroda's Formosan plants have been named.

Research and Publications.—Gentianaceae collected by J. F. Rock in Western China, etc. (Journ. Arn. Arb. **14**, 28 : 1933).

A new variety of Sorbus Sargentiana (Gard. Chron. ser. 3, **94**, 177 : 1933).

Indo-Malaya.—Very considerable progress has been made in the mounting and incorporating of the accumulation of specimens from the Malay Archipelago and Philippine Islands, and most of the current collections have been named and incorporated. The main work has consisted in the preparation of the "Flora of the Presidency of Madras," and satisfactory progress has been made, about three-quarters of the *Gramineae*, the last family to be elaborated, having been completed.

The collection of plants made by the Oxford University Expedition to Sarawak in 1932, amounting to about 3400 numbers (including Cryptogams), has now been sorted, and many families have been sent to specialists for critical determination, e.g. *Pteridophyta* and *Orchidaceae* to Singapore, *Musci* to Mr. H. N. Dixon, *Selaginella* to Mr. A. H. G. Alston, whilst several Dutch botanists, both in Holland and at Buitenzorg, have undertaken the naming of certain smaller groups. This important accession to the Herbarium appears to contain a considerable proportion of undescribed species.

Work has been continued on Capt. F. Kingdon Ward's collections from Upper Burma and Assam (1926–28). Special attention has been devoted to the *Ericaceae* (including *Vacciniaceae*), amongst which there have been detected several new species of great interest and taxonomic importance. One of the most outstanding of these is figured in the recently issued part of "Hooker's Icones Plantarum" (vol. 33, pt. 1), and has given rise to more extensive investigations, the results of which it is hoped to publish in the "Kew Bulletin" in 1934. Fresh material of this and other successful introductions of Capt. Ward's, forwarded to Kew by various well-known amateur gardeners in the United Kingdom, has been either preserved in spirit or dried and incorporated in the Herbarium.

Valuable contributions have been received from the Singapore Botanic Gardens and from the Forestry Department of British North Borneo. Lesser collections were presented by Professor E. Barnes, Rao Bahadur K. R. Venkataramana Ayyar and Mr. P. V. Mayuranathan from the Madras Presidency, by the Imperial Forest Botanist at Dehra Dun and Mr. R. N. Parker from North India and Burma, and by Mr. C. McCann from the Bombay Presidency. Professor Barnes' specimens included several new species from the hill areas of S. India.

A large collection made by the Rev. J. S. and Mrs. Clemens in the Kinabalu Range of British North Borneo was purchased. It is believed that Mr. and Mrs. Clemens have succeeded in penetrating to tracts hitherto unexplored botanically, so that it may be anticipated that when the collection has been studied they will add very greatly to the knowledge of the flora of the region.

A number of specimens and seeds of cultivated species and varieties of *Brassica* were received from the Economic Botanist at the Imperial Agricultural Research Institute, Pusa, for critical

investigation. The seeds have been sown and the enquiry will be pursued further when the plants have grown sufficiently.

At the close of the year the plants collected during the 1933 Mount Everest Expedition were received. These have not been sorted and classified, but a preliminary investigation showed that they form a valuable contribution towards a knowledge of the flora of this region at very high altitudes.

The following collections were also received :—

India.—*Presented* : Bengal, by the Rev. W. J. L. Wenger ; Burma, by the Forestry Department, Maymyo (grasses) ; Kashmir, by Prof. R. R. Stewart ; Madras, by the Agricultural College and Research Institute, Coimbatore (*Pennisetum* and *Phoenix*).

Indo-China.—*Presented* : Siam, by Mr. H. B. Garrett, Dr. A. F. G. Kerr, and the Botanical Section of the Ministry of Commerce, Bangkok (coll. M. C. Lakshnakara).

Purchased : New York Botanical Garden (coll. R. Squires).

Philippine Islands.—*Purchased* : Mr. A. D. E. Elmer.

Research and Publications.—Contributions to the Flora of Siam —Additamentum xxxviii, by the late W. G. Craib (K.B. 1933, 18).

The structure and botanical identity of some scented woods from the East (K.B. 1933, 3).

Petrosavia and Protolirion (K.B. 1933, 156).

Additions to the Flora of Borneo and other Malay Islands : IV, by H. N. Ridley (K.B. 1933, 190).

Dioscoreaceae Novae Asiaticae, by D. Prain and I. H. Burkill (K.B. 1933, 240).

New or little-known plants from South India : II (K.B. 1933, 339).

Contributions to the Flora of Burma : XI (K.B. 1933, 364).

Contributions towards a Flora of British North Borneo : III, by H. N. Ridley (K.B. 1933, 487).

Africa.

The amount of material received for identification has been, as usual, very considerable, the majority being from East Tropical Africa, as was the case last year. In order to save time several collections from each particular colony or dependency have been sorted together and named concurrently. In this way repetition in comparison of species, especially of large genera, has been as much as possible avoided.

Part 6 of vol. 9 of the " Flora of Tropical Africa " was published on January 1st, 1934. This part completes the account of the subfamily *Panicoideae* and contains the index to the volume.

Steady progress has been made in the preparation of the final part of the " Flora of West Tropical Africa." Pending the completion of the account of the *Orchidaceae*, *Gramineae* and *Filices*, the general MS. for the Monocotyledons has been used in naming collections from West Africa and additions have been included

from time to time. Dr. J. M. Dalziel, although laid up for several months by a serious illness, has resumed work on the Economic Appendix, which is nearly finished. A collection from French West Africa, made by M. Pobéguin, has been named and included in the Flora.

The Supplement to the "Flora Capensis," containing an account of the Gymnosperms, was published in March, thus bringing to an end a long and arduous task begun by Harvey and Sonder in 1859.

An important paper published during the year was an enumeration of the plants collected on Mt. Elgon by Major E. J. Lugard and others. This occupied the greater part of K.B. 1933, no. 2.

West Tropical Africa.—From Sierra Leone Mr. F. C. Deighton and Mr. R. R. Glanville have continued to supply collections. The following contributions have also been received: from Liberia, 235 specimens collected by Dr. G. W. Harley; Gold Coast, specimens collected by Dr. F. R. Irvine (including many plants cultivated at the Aburi gardens), Mr. C. Vigne and Mr. T. Lloyd Williams; Nigeria, by Messrs. I. D. Hepburn, A. F. Ross, A. S. Thornewill, F. D. Golding, and C. B. Taylor, including numerous grasses; French Sudan, by Mr. O. B. Lean. General collections from this region were received from Dr. O. Hagerup, the Arnold Arboretum, Harvard University, and the Imperial Forestry Institute, Oxford.

Cameroons and Congo.—A collection of duplicates of grasses, the majority of which are named, has been received from the Brussels Botanic Garden, and a small collection of *Cyperaceae* and *Gramineae* from Mr. T. D. Maitland.

North-East Tropical Africa.—A very fine collection of over 1600 numbers was made in Somaliland and Abyssinia by Mr. J. B. Gillett whilst attached to the British Somaliland–Ethiopia Boundary Commission (see p. 4). Of most of the specimens several duplicates will be available for distribution. A useful supplementary collection has since been received from Major H. C. Godding, an officer of the Commission. From the Sudan, Major G. Aylmer has presented further material, and Mr. W. B. K. Shaw a collection of 41 specimens from the Libyan Desert.

East Tropical Africa.—Messrs. N. V. Brasnett, W. J. Eggeling, and C. M. Harris, of the Uganda Forestry Department, continue to send most valuable collections, mainly of trees and shrubs. About 1300 specimens were received from the Agricultural Department, Uganda, collected by Messrs. P. Chandler, C. Hazel, V. E. Henderson, H. B. Johnston and A. S. Thomas. Corresponding departments in Kenya Colony have also added their quota; Agricultural Department: by Messrs. V. A. Beckley, D. C. Edwards, M. D. Graham, and A. C. Maher; Forestry Department: Messrs. I. R. Dale, H. M. Gardner and others. Miss E. R. Napier and others have forwarded duplicates of collections gathered for the Coryndon Memorial Museum, and a further collection of Mt. Elgon

plants by Mr. T. H. E. Jackson has been received, whilst several consignments have been received from Mr. C. Gilbert Rogers and Mrs. D. R. Tweedie.

Most valuable collections have again been received from Tanganyika Territory, including a large consignment of 854 specimens made by Mr. G. B. W. Wallace (Mycologist), about 250 of these being from Mafia Island; also a well prepared collection of 411 specimens from around Shinyanga by Miss R. D. Bax (including some water-colour sketches); further specimens have been received from the Agricultural Department collected by Messrs. R. B. Allnutt, R. M. Davies, V. F. Jessel, and N. V. Rounce. Mr. B. D. Burtt has continued to send most useful material, mainly from the mountains, whilst Mr. P. G. Greenway has forwarded several consignments collected by himself and others, including Messrs. H. E. Emson, C. Harvey, R. E. Moreau and R. R. Staples. A small collection of medicinal plants was received from Prof. T. K. Penniman, University Museum, Oxford, and further material from Mr. G. W. St. Clair Thompson.

South Tropical Africa.—The amount of material from this geographically important region has been less than usual. Mr. F. Eyles has sent small collections from Southern Rhodesia and Mr. C. G. Trapnell about 170 specimens, mainly grasses, from Northern Rhodesia. A set of 18 new species of *Gramineae* has been received from Miss Stent. Small collections of herbs have been forwarded by the Imperial Forestry Institute, Oxford. From the Department of Agriculture, Nyasaland, have been received small collections, including specimens of Rices and Sorghums. Senhor A. F. de Gomes e Sousa has again sent about 200 plants for determination from Portuguese East Africa, and Mr. J. Gossweiler 420 from Angola. Good general collections from this South Tropical region are much desired.

Mascarene Islands.—Several small consignments, including a set of palms, have been received from Mr. R. E. Vaughan.

Research and Publications.—During the year a revision of the giant Lobelias of East Africa has been prepared and will be published in the "Kew Bulletin" early in 1934. A critical enumeration of Mr. Gillett's important collection from Somaliland and Abyssinia has been partly carried out. Mr. V. S. Summerhayes and Mr. F. Ballard have devoted as much time as possible to West African Orchids and Ferns respectively.

The following papers have been published:—

The Flora of Mt. Elgon, with an Introduction by E. J. Lugard (K.B. 1933, 49).

Tropical African Plants: X and XI (K.B. 1933, 142 and 467).

New Trees and Shrubs from Tropical Africa, by A. C. Hoyle & H. Dunkley: II (K.B. 1933, 170).

Central African Canoes (K.B. 1933, 202).

African Orchids: V (K.B. 1933, 246).

Notes on African Grasses: XIII and XIV (K.B. 1933, 269 and 498).

The Genus Trichocladus (K.B. 1933, 427).

Agave amaniensis: A new form of Fibre-producing Agave from Amani (K.B. 1933, 465).

South Africa.—Over 800 specimens were received from the National Herbarium, Pretoria, mostly for identification or verification. Particularly good and well prepared collections were received from Capt. T. M. Salter, R.N., including a very fine series of specimens of the genus *Oxalis*, which is usually not well represented in herbaria owing to difficulty in drying; also another excellent set of specimens from Mr. F. R. Long, Port Elizabeth, and a small collection from Mrs. M. C. Gillett. The Curator of the Bolus Herbarium kindly allowed the extraction of portions of specimens of new species not represented at Kew. These have now been presented and form a most valuable addition to the collections. Small donations have been received from the Albany Museum, the Natal Herbarium, the Transvaal Museum and from Dr. J. Muir, Riversdale.

In connection with his work on the "Flora of Albany and Bathurst," Mr. R. A. Dyer has received and revised the determinations of about 1600 mounted specimens from the Albany Museum, Grahamstown.

About 60 specimens were purchased from Mr. E. G. Bryant, Prieska Division.

Research and Publications.—The Vegetation of Schoemanskloof, Eastern Transvaal, by J. C. Smuts (K.B. 1933, 417).

Notes on the Flora of Southern Africa: IV (K.B. 1933, 459).

America.

During the year 13,062 sheets have been mounted, and over 5500 sheets have been incorporated.

The largest and most interesting collection received is undoubtedly that of Mr. G. B. Hinton, from the district of Temascaltepec, Mexico. Mr. Hinton is making an exhaustive collection of the vegetation of the district, and his numbers already run into several thousands. Of these the *Leguminosae* and certain other polypetalous families have been examined and named. In the early part of the year several hundred undetermined sheets were forwarded for naming from the Jenman Herbarium, Georgetown, British Guiana. These included material of some rare and new species, and duplicate sheets of many of them were retained, through the kindness of the Department of Agriculture. Among the other collections which were studied have been those of Miss Dora B. Stafford from Peru, of Mr. A. E. Lawrance from the State of Boyacá, Colombia, and Mr. Clarence Elliott's second collection from Chile.

Several weeks were spent in collaboration with Mr. R. O. Williams, of the Department of Agriculture, Trinidad, in checking the

typescript of his account of the important families *Melastomaceae* and *Myrtaceae* for the "Flora of Trinidad and Tobago." Mr. Williams has most generously selected a large series of duplicates of species of these families for presentation to Kew.

Very valuable series of specimens, either through presentation, purchase or exchange, have come in from all parts of America. In addition to those already referred to, the collections of Miss I. W. Hutchison in Alaska, and of Mr. F. S. Chapman in Greenland may be mentioned, also duplicate *Salices* from the National Museum of Canada and from the University of California, Berkeley; a fine series of tropical American and Peruvian duplicates from the Field Museum, Chicago; and a set of *Bignoniaceae*, collected in Brazil and Peru by Mrs. Ynes Mexia, presented for naming by Mrs. H. P. Bracelin, of the University of California, Berkeley.

The following collections were also received:—

North America.—*Presented*: Labrador, by the Gray Herbarium, Harvard University (coll. E. C. Abbe and H. Bishop); United States, by Dr. F. A. Rodway, Nowra, New South Wales (California plants, coll. L. S. Rose); Pomona College, Claremont, California (coll. mainly P. A. Munz); Dr. D. D. Keck, Stanford University, California; and by the Bureau of Plant Industry, United States Department of Agriculture, Washington (bamboos).

Central America.—*Presented*: Panama, by the Botanical Museum, Harvard University (Orchids). *Purchased*: Mr. W. A. Schipp, British Honduras plants.

West Indies.—*Purchased*: Mr. W. E. Broadway, Trinidad plants; Prof. G. Samuelsson, *Cyperaceae* from Haiti, collected by the late E. L. Ekman; Mr. E. J. Valeur, Dominican Republic plants.

East Tropical South America.—*Presented*: Brazil, by the Riksmuseum, Stockholm, and by the Gray Herbarium, Harvard University. *Purchased*: New York Botanical Garden, Amazonian plants (coll. B. A. Krukoff).

West Tropical South America.—*Presented*: Ecuador, by the Botanical Museum, Oslo University. *Purchased*: New York Botanical Garden, Colombian plants (coll. A. E. Lawrance); United States National Museum, Peruvian plants (coll. G. Klug); Mr. T. O. Weigel, Herbarium Bolivianum, by Buchtien, cent. viii, and nos. 1–50, cent. ix.

Temperate South America.—*Presented*: Argentine, by Mr. A. Burkart; Prof. J. F. Molfino; Prof. L. R. Parodi; the Museo Nacional de Historia Natural, Buenos Aires (*Nototriche*, *Malvastrum* and *Lilaeopsis*); and by the Bureau of Plant Industry, United States Department of Agriculture, Washington (Grasses, coll. S. Venturi). *Purchased*: Dr. A. Donat, Plantae Patagonicae, cent. iv.

Research and Publications.—The following papers have been published during the year:—

Sarracenia purpurea var. stolonifera, by John M. Macfarlane and D. Walter Steckbeck (K.B. 1933, 161).

Notes on the Trinidad and Tobago species of Lauraceae, by R. L. Brooks (K.B. 1933, 209).

The genus Ceratophytum (K.B. 1933, 321).

New species and first records from British Guiana, mainly collected by Mr. T. A. W. Davis (K.B. 1933, 323).

The genus Strychnos in British Guiana and Trinidad (K.B. 1933, 390).

New species of Nototriche and Malvastrum from the Argentine (K.B. 1933, 485).

Three new species from British Guiana (K.B. 1933, 495).

Australia, New Guinea and New Zealand.

During the year approximately 1600 specimens have been mounted and 1800 sheets incorporated. Routine work included the answering of queries received from various sources. Numerous specimens of grasses were received for identification from the Brisbane Herbarium, and 110 of these have been named, including a valuable collection made by Mr. L. J. Brass in North Queensland which contained several additions to the Queensland flora. Prof. J. B. Cleland presented a further collection of grasses from areas in South and Central Australia poorly represented at Kew. Dr. K. Domin kindly continued to lend type specimens from his Queensland collections, which have been of great assistance in the identification of Australian grasses.

Further instalments of useful material, mostly from New South Wales, were received from Dr. F. A. Rodway, and valuable collections of Queensland plants from Mrs. E. Thomson and the Brisbane Herbarium. A small set of named duplicates of plants collected by Mr. S. F. Kajewski in Queensland was presented by the Arnold Arboretum, Harvard University.

From New Guinea an interesting collection was received from Miss L. E. Cheesman, and a small consignment of named specimens collected by Mr. L. J. Brass from the Arnold Arboretum. A small but interesting collection of orchids was sent by the Department of Agriculture and has been named.

Research and Publications.—The detailed study of the Australian and New Zealand Gaultherias and Pernettyas and their relationships with allied genera was continued.

Oceania.

During the period under review 695 specimens have been mounted and 575 sheets incorporated. Material received from this area was about the same in quantity as in previous years, but owing to lack of time little progress has been made with the naming of the collections. The Solomon Islands have again provided the largest accessions, including plants collected by Mr. J. H. L. Waterhouse,

sent direct or for determination by the School of Forestry, Yale University. Mrs. C. J. Parham forwarded further material from Fiji. A large number of named specimens, mostly from Hawaii, but also including many Fiji plants collected by the late Dr. J. W. Gillespie, was received from the Bernice P. Bishop Museum, Honolulu, while the Arnold Arboretum presented a set of specimens collected in New Caledonia by Mr. I. France.

Work was continued on the Santa Cruz Islands collection made by Mr. S. F. Kajewski and also on figs collected in Samoa and sent for determination by the Bernice P. Bishop Museum.

Pteridophyta.

More than 1800 sheets were incorporated during the year while many hundreds more awaiting incorporation were arranged in alphabetical sequence of genera in separate cabinets.

No large additions to the fern collections have been presented during the year. Amongst the more interesting sets received were : (1) 130 specimens collected by Brig.-Gen. F. E. W. Venning in the Murree Hills, N.W. Himalayas ; (2) more than 160 specimens from Mexico collected by Mr. G. B. Hinton ; these were excellent specimens upon which much care had obviously been expended ; (3) 70 specimens from Yunnan, presented by the Fan Memorial Institute of Biology, Peiping ; (4) a set of 90 specimens collected in the Fiji and Society Islands by the late Dr. J. W. Gillespie and Dr. M. L. Grant respectively.

The investigation into the fern flora of West Africa in connexion with the fourth part of the " Flora of West Tropical Africa " has been continued, although, owing to the large amount of routine work, progress has been slower than had been hoped.

Musci, Hepaticae and Charophyta.

An interesting and little known economic use of mosses was brought to light by enquiries concerning *Sphagna* from the Government Chemical Research Laboratories. Hitherto the supplies of ' moss litter ' used as a ' tell tale ' to be mixed with tobacco waste on which the duty had been refunded, were obtained from sources on the continent. An investigation was made of the various samples brought to Kew, sample gatherings of various species of the genus were collected, and after study of the problem it was suggested that if a supply of pure *Sphagnum* obtained from certain areas in the country was used instead of the mixed ' litter ' a much smaller percentage would be required with correspondingly increased economy and efficiency.

During the year a collection of British Columbian mosses made by Mrs. R. Morris was received for identification and a number of named mosses collected by Dr. A. F. G. Kerr in Siam was presented by Mr. H. N. Dixon. Series 5 and 6, Hepaticae Selectae et Criticae, were purchased from Mr. Fr. Verdoorn. In addition to several

small British collections, a number of critical New Zealand hepatics collected by Mr. K. W. Allison have been named.

Mr. C. V. B. Marquand continued his studies on arctic-alpine bryophyte ecology, in the course of which he visited islands in the Hebrides during his ordinary leave.

Research and Publications.—Report of the Excursion of the British Bryological Society to Norway in July–Aug. 1932 (Rep. British Bryol. Soc. 1932, **3**, 19 : 1933).

A short paper, " Riccia Beyrichiana in Arctic Europe," has been prepared for the " Journal of Botany," and one was read before the Linnean Society entitled " The Vegetation of the Island of Rum " (Proc. Linn. Soc. pt. 1, session 1933–34, in the press).

Thallophyta.

Algae.—Considerable time was as usual spent in naming small British collections, and answering miscellaneous enquiries. Material has been acquired from the Central Experimental Farm, Ottawa, Canada ; Prof. F. Boergesen (Danish West Indies and India) ; the Independent Biological Laboratories, Tel Aviv, Palestine ; and from the Lingnan University, Canton, China. The large number of Indian specimens sent on loan to Prof. F. Boergesen for his work on the algae of Bombay has been returned and incorporated. His revised determinations include several new species.

Prof. T. A. Stephenson has continued to send algae collected during his general biological survey of selected districts of the South African coast. A representative set has been presented to Kew including some new species and others not represented in the Herbarium.

As a result of a request from the Botany School, Cambridge, Miss C. I. Dickinson visited Scolt Head Island, Norfolk, to collect and identify the marine algae and lichens in connexion with the biological survey of that area which is being undertaken by Mr. V. J. Chapman. Two short visits were paid and the results will be incorporated in a handbook to Scolt Island, to be produced early in 1934 by the Norfolk and Norwich Naturalists' Society.

Research and Publications.—Some Indian Rhodophyceae especially from the shores of the Presidency of Bombay : III, by F. Boergesen (K.B. 1933, 113).

Lichens.—Numerous small collections presented to Kew, several of which required identification, have been dealt with and laid in. A considerable amount of material has been sent on loan from Kew.

In connexion with the Scolt Survey (see above) Miss C. I. Dickinson spent a week on the island in November for work on lichens. This resulted in the collection for Kew of a set of excellent material of all the lichens found on the island. Some noteworthy fungus records were also added.

Fungi.—A large accumulation of arrears of laying in and of specimens for distribution has been dealt with, largely with the help of a temporary assistant provided in the latter part of the year. The incorporation has now been brought up to date, and sets of duplicates have been distributed to the Farlow Herbarium, United States Department of Agriculture, Berlin and Paris, as well as to specialists who have contributed material of groups studied by them.

Miscellaneous enquiries were again very numerous, and have covered a varied field, including, for instance, diseases of horticultural plants, the examination of fungi on mine timbers from South Africa, and the identification of fungi growing in mushroom beds. Loan transactions have been fewer than usual, but on the other hand requests from research workers in other parts of the world for the critical examination of types and comparison of material continue to increase. Such enquiries referred, amongst others, to the following groups: *Xylaria* spp. from Prof. J. H. Miller, University of Georgia, U.S.A., and resupinate *Hydnaceae* from Prof. G. W. Martin, University of Iowa.

Among the larger collections of fungi received for naming were consignments from India (Rev. G. Foreau and Dehra Dun Forest Research Institute), Sarawak (Oxford University Expedition), China (Lingnan University, Canton), Uganda (Mr. C. G. Hansford), Kenya (Mr. C. A. Thorold), and South Africa (Miss A. M. Bottomley and Prof. P. A. van der Byl).

Collections presented include: *Ustilagineae*, collected by Dr. G. L. Zundel, *Coleosporium* spp. collected by Dr. G. G. Hedgcock and miscellaneous fungi from the collections of the late Ellsworth Bethel (Bureau of Plant Industry, United States Department of Agriculture); Basidiomycetes (Prof. L. O. Overholts); various lower Basidiomycetes (Prof. G. W. Martin); decades i and ii, Fungi Polonici Selecti Exsiccati, and miscellaneous fungi (Kornik Institute). Fascs. 1 and 2, Fungi Carpatici Exsiccati were purchased from Dr. A. Pilát.

Research and Publications.—An investigation into the method of overwintering of *Botrytis elliptica* Cooke—the cause of leaf spot disease in *Lilium candidum*—was undertaken by Miss M. R. F. Taylor. Evidence was obtained that, in addition to infection by spores derived from germinating sclerotia, lesions on the old basal leaves containing living mycelium produce conidia in April which can bring about infection of the young shoots.

Preliminary List of Diseases of Economic Plants in British Guiana, by E. B. Martyn (K.B. 1933, 107).

Detection and Control of Lily Disease, by A. D. Cotton. The Lily Year-Book 1933, 194.

Biological and Genetical Herbaria.

About 2200 sheets have been added to these collections during the year. These include: (1) additional material illustrating the

ecological survey of Richmond Park ; (2) large series of specimens to show the range of variation in salt marsh, sand dune, and shingle plants, from Norfolk ; (3) further specimens connected with breeding work in *Anthyllis*, *Saxifraga*, *Ranunculus*, *Silene*, and *Centaurea* ; (4) a complete set of scored specimens to illustrate ecotype and biotype variation in high mountain campions (*Silene glareosa*, *S. alpina*, *S. vulgaris*) ; (5) a set to illustrate variation, etc., in the genus *Zostera* ; (6) numerous specimens of various genera filling in gaps in the life-history and plasticity series of British plants.

Summary.

The routine work, apart from naming, accomplished during 1933 is summarised as follows :—

Mounted	57,650 (approx.)
Incorporated	44,300 (approx.)
Duplicates distributed	6,571
Specimens received on loan	9,408
Specimens sent out on loan	6,136
Specimens presented or purchased ...	69,847

Miss M. M. Whiting continued to give very valuable voluntary help in arranging and classifying the Indo-Malayan material and during the latter part of the year similar assistance was provided by Miss M. R. F. Taylor and Miss D. A. Chaytor in the African and European departments respectively.

Illustrations and Portraits.

The routine work of preparing drawings and taking photographs has again been heavy. About 250 sheets of type or authentic specimens borrowed from other herbaria have been photographed for the Kew collection, and about 700 sheets of Kew specimens have been photographed for other institutions.

At the beginning of the year the scheme for re-arranging the entire collection of drawings (including published illustrations) so as to bring them nearer to the corresponding herbarium specimens was brought into operation. Except in the case of very large drawings, each one was remounted on an ordinary herbarium sheet. These are being incorporated in cabinets in the same wing of the Herbarium, and as far as possible on the same floor, as the specimens to which they are related. Those drawings which are larger than the size of herbarium sheets remain on their original mounts and are kept as a separate collection.

Some 7000 drawings and photographs were mounted during the year and the work is nearly complete.

Amongst those received and incorporated were the following :— 61 original water-colour drawings prepared for the " Botanical Magazine " and 79 drawings and photographs, presented by the Royal Horticultural Society ; 40 plates of the Flowering Plants of South Africa, from Dr. I. B. Pole Evans ; 72 photographs from the

Field Museum, Chicago; 141 photographs of type-specimens in European herbaria, from Dr. Maxon, U. S. National Herbarium, and numerous plates of *Dioscorea* species to appear in the "Annals of the Royal Botanic Gardens, Calcutta," presented by Mr. I. H. Burkill. Other drawings and photographs have been received from numerous sources. A large number of photographs of type specimens not at Kew has been mounted in envelopes and placed in the herbarium.

Two parts of "Hooker's Icones Plantarum" appeared, ser. 5, vol. 2, pt. 4 in May, and vol. 3, pt. 1 in December. An important function of the "Icones" is the illustration and description of unique and rare plants represented in the Kew herbarium. One of the chief impediments to the progress of systematic botany is the fact that many new species are based on single specimens or sheets, and in such cases adequate figures with the necessary dissections are invaluable. As examples, the very rare Asclepiads, *Fockea cylindrica* (Hook. Ic. Pl. t. 3221), and *F. gracilis* (t. 3222) may be mentioned. Each is known only from a single locality in the Albany Division, South Africa.

Nomenclature, Terminology and Bibliography.

The preparation of new editions of the handlist of "Rock Garden Plants" and of "Trees and Shrubs" has entailed a great amount of nomenclatural as well as taxonomic research and a considerable amount still remains to be done. An increasing number of enquiries is received from correspondents desiring information and advice on problems connected with nomenclature and bibliography. Six nomenclature papers and two notes have appeared during the year in addition to two papers concerned with bibliography.

In conjunction with two botanists from abroad a paper on the conservation of certain generic names is being prepared. At the Sixth International Botanical Congress held at Cambridge in 1930 it was decided that later homonyms should be rejected even if the earlier name is illegitimate or is generally treated as a synonym on taxonomic grounds. It is, therefore, considered advisable to make a systematic search for later generic homonyms and in each case to decide whether or not the names shall be proposed for conservation at the next botanical congress to be held in Amsterdam in 1935.

An important contribution to the history of botany was made by the publication of glossaries of botanical terms used in the first, seventh and thirteenth centuries by the elder Pliny, Isidorus of Seville, and Albertus Magnus respectively. An article on plant morphology in Albertus Magnus sheds light on the morphological concepts held by the greatest botanist of the thirteenth century, remarkable instances of reasoning from homology being given.

A condensed account of the principal provisions of the International Rules of Botanical Nomenclature was prepared (see below). This has been found of great use pending the appearance of the

third edition of the "International Rules." A paper entitled "Rules of Botanical Nomenclature" originally published in the "Empire Forestry Journal" for 1931 was reprinted in China in July, 1933, primarily for the use of the university students of Canton.

Publications.—Nomenclature: Eragrostis major and E. minor (K.B. 1933, 15).

Silene Cucubalus: the correct name of the Bladder Campion (K.B. 1933, 151).

The History of Nothopanax (K.B. 1933, 154).

Northea Hornei or N. seychellana (K.B. 1933, 206).

Plant Nomenclature (B.E.C. Report, 1932, 300: 1933).

Podostemaceae or Podostemonaceae (K.B. 1933, 46).

Abies pindrow (K.B. 1933, 414).

Nomenclature of some Australian and Philippine Islands Plants, by C. T. White (K.B. 1933, 45).

Terminology: Botanical Terms in Pliny's Natural History (K.B. 1933, 30).

Botanical Terms in Isidorus (K.B. 1933, 401).

Plant Morphology in Albertus Magnus (K.B. 1933, 431).

Botanical Terms in Albertus Magnus (K.B. 1933, 440).

Bibliography: The Dates of Hooker's "Companion to the Botanical Magazine" (K.B. 1933, 362).

Dates of publication of Royle's "Illustrations" (K.B. 1933, 378).

Index Kewensis.

The first proof of "Index Kewensis Supplement VIII" was received on January 10th and the last sheet of revised proof was returned to the Press on September 29th with the result that, thanks to the promptness of the Clarendon Press, the Supplement appeared in November. This Supplement therefore appeared less than three years after the end of the quinquennium, thus returning to the time taken for publication in pre-war days. It also appears four years after the publication of Supplement VII in 1929.

The plan of Supplement VIII is similar to that of Supplement VII and its size is approximately the same. The alphabetical list of new genera under their families as an appendix to the Supplement is continued, as it has proved such a very welcome and useful innovation in Supplement VII. Supplement VIII covers the quinquennium 1926–30, and thus another stage in the history of the "Index Kewensis" closes, for in order to conform to the International Rules and Recommendations as revised at Cambridge in 1930, the method of citation in the next Supplement will be slightly different from that hitherto adopted. For instance, in citing a new combination the original author's name will be included in brackets immediately after the specific epithet and the author of the new combination will follow, e.g. *Gentiana angustata* (C. B. Clarke) Marquand in Kew Bull. 1931, 70: *Crawfurdia angustata*. The comma between the specific epithet and the author's name will be omitted.

The compilation of Supplement IX (1931–35) is now in progress and there are already about 3000 new names in the card catalogue, arranged alphabetically, and available for consultation by the Kew staff and visiting botanists.

Seed Collection.

Messrs. Sutton & Sons, James Carter & Co., and J. MacDonald have presented packets of seeds of their lawn grasses. A small quantity from each sample has been incorporated in the seed collection and the remainder has been sown in the Gardens in order to obtain herbarium specimens. In addition about 150 miscellaneous packets of seed have been added to the collection during the year. It has been much used, especially in connection with the identification of Near Eastern and other drug-yielding fruits and seeds.

An almost complete set of seeds of the genus *Lilium* was prepared for exhibition at the Royal Horticultural Society's Lily Conference, and is now on view in Museum no. 1.

Experimental and Transplant Work.

Research was continued at Potterne and Kew on *Silene*, *Centaurea*, and *Saxifraga*. A large number of generations of high mountain plants of *Silene* were analyzed for comparison with lowland populations and F_2 generations involving colour and indumentum of vegetative parts in *S. vulgaris* were scored. F_2 generations of interspecific crosses in *Centaurea* flowered on the new ground and about 1400 plants were scored. The breeding research on the cross *S. rosacea* × *S. granulata*, its reciprocal, and back-crosses, has, it is hoped, been completed. Preliminary investigations of a statistical-genetical nature have been commenced on petal size and shape within the species *S. granulata*. Work on *Anagallis* is proceeding.

The transplant experiments are being continued and a third report has been prepared giving details of the results obtained to the end of 1933, i.e. for the last two of the six years during which the experiments have been conducted. This report will be published in due course in the " Journal of Ecology."

Publications.—Researches on Silene maritima and S. vulgaris: XI–XII. (K.B. 1933, 357, 479).

Notes on the Taxonomy of British Material of Anthyllis Vulneraria. (Journ. Bot. **71**, 207 : 1933).

Studies in Variation of Anthyllis Vulneraria (Journ. Genetics, **27**, 261 : 1933).

Second Report on the Transplant Experiments of the British Ecological Society at Potterne, Wilts. (Journ. Ecol. **21**, 268 : 1933).

Visitors.

The number of signatures in the Visitors' Book for 1933 was 5263. Amongst frequent or regular visitors were members of the

staffs of the Department of Botany, British Museum ; Imperial Mycological Institute ; and also that employed by the Royal Horticultural Society on the Index Londinensis and Botanical Magazine.

In addition, the most noteworthy or frequent visitors to the Herbarium were the following :—

Major G. Aylmer, Khartoum.

Mr. E. G. Baker ; Mr. W. J. Bean ; Mr. L. A. Boodle ; Dr. G. A. Boulenger, Brussels ; Prof. C. E. B. Bremekamp, Utrecht ; Dr. N. E. Brown ; Prof. A. H. R. Buller, Winnipeg ; Mr. I. H. Burkill ; Dr. E. J. Butler.

Mr. W. S. Chamberlain ; Mr. Chao-chien Chang, Nanking ; Mr. E. J. H. Corner, Singapore ; the late Prof. W. G. Craib.

Dr. J. M. Dalziel ; Dr. J. Burtt Davy ; Mr. H. N. Dixon ; Mr. H. Dunkley.

Mr. J. Ehrlich, Cambridge, Mass.

Dr. H. R. Fletcher ; Dr. F. W. Foxworthy, Kepong, F.M.S.

Miss S. Garabedian, Cape Town ; Mr. J. B. Gillett ; Mr. W. B. Grove ; Mr. E. R. Guest, late of Iraq.

Dr. D. Hooper ; Mr. A. C. Hoyle.

Dr. I. M. Johnston, Arnold Arboretum ; Mr. Sven Junell, Uppsala.

Dr. A. F. G. Kerr ; Miss J. Th. Koster, Leiden.

Mr. J. E. Lousley.

Prof. N. Malta, Riga.

Miss A. A. Obermeyer, Pretoria ; Dr. S. J. van Ooststroom, Utrecht.

Mr. W. R. Philipson : Mr. F. J. Pound, Trinidad ; Mr. W. R. Price.

Prof. H. W. Rickett, Columbia, Mo. ; Mr. H. N. Ridley.

Mrs. C. Sandwith ; Monsieur M. Simonet, Paris ; Dr. Lyman B. Smith, Gray Herbarium ; Mr. J. D. Snowden ; Miss M. S. Sprague ; Mr. W. T. Stearn ; Mr. Duncan Stevenson ; Mr. P. M. Synge.

Mr. A. W. Trethewy ; Mr. T. G. Tutin.

Mrs. M. L. Wedgwood ; Mr. R. O. Williams, Trinidad.

Distribution of Duplicates.

The following were the principal institutions to which duplicates were distributed :—

Great Britain and Irish Free State.—Aberdeen, Cruickshank Botanic Garden ; British Museum (Natural History) ; Oxford, Imperial Forestry Institute ; Dublin, Trinity College.

Europe and Orient.—Baku, Herbarium of the U.S.S.R. Academy of Sciences ; Belgrade, Botanic Gardens ; Berlin, Botanic Gardens and Museum ; Brno, Masaryk University ; Brussels, Botanic Garden ; Florence, Botanical Institute ; Paris, Natural History Museum ; Sarajevo, State Museum ; Sofia, University, Department of Botany ; Stockholm, Botanical Museum ; Uppsala, Botanical Institution ; Utrecht, University Botanic Museum and Herbarium ;

Vienna, Natural History Museum ; Zürich, Botanic Garden and Museums.

Africa.—Nairobi, Coryndon Memorial Museum ; Amani, East African Agricultural Research Station ; Pretoria, Division of Plant Industry.

Asia.—Canton, Sun Yat-Sen University ; Singapore, Botanic Garden.

Australia.—Brisbane, Botanic Museum and Herbarium.

Oceania.—Honolulu, Bernice P. Bishop Museum.

America.—Ottawa, Central Experimental Farm ; Harvard University, Farlow Herbarium and Gray Herbarium ; Pennsylvania, State College ; Washington, U.S. Department of Agriculture, Bureau of Plant Industry.

The Library.

The most important presentations received in the Library during 1933 are as follows :—

The Bentham-Moxon Trustees have presented a number of valuable works, including about fifty books, published and in manuscript, and 350 botanical tracts, from the library of the late Dr. O. Stapf. Three other important items presented are : G. Bonnier, *Flore complète, illustrée en couleurs, de France, Suisse et Belgique,* 11 vols. (bound), 1911–31 ; S. Curtis, *Beauties of Flora,* 1806–20, title-page and 8 plates, which complete the Kew copy of this sumptuous work, hitherto represented by two plates only ; S. Taylor, 47 *paintings of plants,* c.1760. Taylor, who died in 1772, was a botanical painter employed by the Earl of Bute to make drawings of rare plants at Kew. The above collection is probably a portion of these Kew drawings. Other gifts from the Trustees include : L. Colla, *Herbarium Pedemontanum,* 8 vols., 1833–37 ; C. Gesner, *De raris et admirandis herbis,* 1555 ; Mrs. M. Grieve, *A modern herbal,* 2 vols., 1931 ; T. Panckow, *Herbarium portatile,* 1654 (the rare first edition) ; R. Parnell, *The grasses of Britain, Illustrated,* 1845 ; and N. Winckler, *Chronica herbarum,* 1571.

As in previous years volumes or parts in continuation of several periodicals, received in exchange for *Hooker's Icones Plantarum,* have been presented by the Bentham-Moxon Trustees.

From the Royal Horticultural Society have been received the *Classified list of daffodil names,* the *Daffodil Year-Book,* and the *Lily Year-Book,* all published in 1933. A bound copy of the last mentioned has been sent by Major F. C. Stern. The Society has also presented its *List of awards to decorative plants, fruits and vegetables,* 1927–31, and *List of awards given to orchids . . .* 1859–1915, 1916–24, 1925–26, and 1927–31 (2 copies of each of the four lists).

Lieut.-Col. Sir David Prain has presented the continuation of various periodical and other publications.

Dr. Sydney H. Long, Honorary Secretary of the Norfolk and Norwich Naturalists' Society, has given to the library, on behalf

of the Society, an almost complete set of their *Transactions*, which date from 1869.

Chief among the publications received during 1933 from the New York Botanical Garden are *Addisonia* and the *North American Flora*, both in continuation.

The following books have been received from the publishers, chiefly for review in the " Kew Bulletin " : From Messrs. Edward Arnold and Co. : S. Burr and Dorothy M. Turner, *British economic grasses : their identification by the leaf anatomy*, 1933 ; F. K. Ward, *Romance of plant hunting*, ed. 2, 1933. From the Crown Agents for the Colonies : D. A. Bannerman, *Birds of Tropical West Africa*, vol. iii, 1933. From Messrs. E. & S. Livingstone : J. M. Watt, and Maria G. Breyer-Brandwijk, *Medicinal and poisonous plants of Southern Africa*, 1932. From Messrs. Macmillan : C. T. Simpson, *Florida wild life*, 1932. From Sir Isaac Pitman & Sons : H. S. Redgrove, *Spices and condiments*, 1933. From Messrs. Ward, Lock & Co. : A. Osborn, *Shrubs and trees for the garden*, 1933.

The more important publications received from the Editor of Nature are : L. H. Bailey, *The cultivated conifers*, 1933 ; J. Braun-Blanquet, *Plant sociology . . . translated by G. D. Fuller and H. S. Conard*, 1932 ; C. T. Green, *Flora of the Liverpool district*, 1933 ; H. W. Kew, and H. E. Powell, *Thomas Johnson, botanist and royalist*, 1932 ; A. C. Mahr, *The visit of the " Rurik " to San Francisco in* 1816, 1932 ; G. E. Post, *Flora of Syria, Palestine and Sinai*, ed. 2, *. . . by J. E. Dinsmore*, vol. I, 1932 ; C. E. Salmon, *Flora of Surrey, edited by W. H. Pearsall*, 1931, and F. Verdoorn (Editor), *Manual of Bryology*, 1932.

The more important independent works received include the following presented by the authors unless otherwise stated : H. H. Allan, *New Zealand trees and shrubs*, 1928 (from Dr. F. A. Rodway) ; L. H. Bailey, *Gentes Herbarum* vol. II, fasc. 7, 1932, and vol. III, fasc. 1–3 ; Mrs. H. M. L. Bolus, *Notes on Mesembrianthemum and allied genera*, pt. 2, pp. 377–396 (3 copies) ; A. Borza (Editor), *Guide de la Sixième Excursion phytogéographique internationale, Roumanie*, 1931, 1931 ; L. Chalk, and J. Burtt Davy (Editors), *Forest trees and timbers of the British Empire*, II ; *Twenty West African timber trees* (2 copies, from the Oxford University Press and the Imperial Forestry Institute, Oxford) ; J. Copeland, *Manual of Arboriculture for Burma, revised edition*, 1932 (from the Government Press, Rangoon) ; O. Degener, *Flora Hawaiiensis*, about 100 ff. ; É. De Wildeman and P. Staner, *Contribution à l'étude de la flore du Katanga, suppléments* IV *and* V (from Comité Special du Katanga) ; É. De Wildeman, *Plantae Bequaertianae*, vol. V, fasc. 5, 1932, and vol. VI, fasc. 1 ; K. Domin, *Pteridophyta* (an illustrated monograph) 1929 ; P. F. Fyson, *Flora of the South Indian Hill Stations*, 2 vols, 1932 ; Mr. J. H. Heucher, *Magic plants : being a translation of a curious tract . . . by M. J. H. H.* (1700), *edited by E. Goldsmith*, 1886 (from Mr. H. G. Cousens) ;

A. R. Horwood, and C. W. F. Noel, 3rd Earl of Gainsborough, *Flora of Leicestershire and Rutland* (from Mr. Horwood) ; W. F. Kirby, *European butterflies and moths, with* 61 [62] *coloured plates*, 1889 (from Mr. J. H. Holland) ; A. Luisier, *Musci salmanticenses*, 1924 (from Mr. P. W. Richards) ; D. T. MacDougal, and E. B. Working, *The pneumatic system of plants, especially trees* (from the Carnegie Institution of Washington) ; A. Osborn, *Shrubs and trees for the garden* (from Messrs. Ward, Lock & Co.) ; R. N. Parker, *Common Indian trees* (from Manager of Publications, Delhi) ; R. S. Pearson, and H. P. Brown, *Commercial timbers of India*, 2 vols., 1932 (from High Commissioner for India) ; Messrs. Sanders, (1) *Sanders' orchid guide, revised* (1927) *edition* and (2) *Orchid hybrids* : *Sanders' complete list*, 2 vols. (in one), 1921 and 1931 (2 copies) (from Messrs. Sanders) ; W. Suksdorf, *Werdenda* : *Beiträge zur Pflanzenkunde*, Bd. i, nos. 5–8, 1931 (from State College of Washington) ; C. B. Tahourdin, *Native orchids of Britain*, 1925 ; T. Tanaka, *Citrus studies* ; J. McL. Thompson, *Studies in advancing sterility*, pt. VI, in *Publications of the Hartley Botanical Laboratories*, No. 11 ; C. H. Wehdeman, *A description of trees and curious plants in the interior of the promontory of the Cape of Good Hope, illustrated with* 60 *drawings . . . from nature* (an unpublished, rare work from the Rev. Canon F. W. Galpin) ; A. White, and B. L. Sloane, *The Stapelieae* ; R. O. Williams, *Gardening in the tropics, revised edition*. Those of which the year of publication is not stated were issued in 1933.

The number of periodical publications presented is large and space is limited, so that the following represent only some titles additional to those mentioned in recent reviews. They are sent by the editors, societies or institutions issuing them, unless otherwise stated : *Acta Botanica Fennica* (Societas pro Fauna et Flora Fennica) 10–11, 1931–33 ; *Acta pro Fauna et Flora Universali* (Bucarest), *Ser.* II, *Botanica*, Vol. i, Nos. 1–4 and 7–8 (1932–33) ; *Acta Instituti et Horti Botanici Universitatis Tartuensis* (*Dorpatensis*), vol. iii, fasc. 1–4 ; *Acta Phytochimica*, vol. vii, No. 1 ; *Annals of the Royal Botanic Garden, Calcutta*, vol. xiii, 1931, 1 vol. of text and 102 plates (His Excellency the Governor of Bengal) ; *Annuario della Reale Accademia d'Italia*, iv, 1931–32 ; *Archives de l'Institut Botanique de l'Université de Liége*, vols. vii–ix, 1928–32 ; *Boletim da Sociedade de Estudos da Colónia de Moçambique*, Ano i, nos. 1–6, and Ano ii, nos. 7–10 ; *Botanical Museum Leaflets*, Nos. 4–10 ; *Bulletin international, Académie Tchèque des Sciences*, etc., Année xxxi and xxxii, 1930 and 1931 ; *Bulletin of the College of Agriculture and Forestry, University of Nanking*, Nos. 2–7 and 9–10 (New Series) ; *Bulletin of the Independent Biological Laboratories* (*Tel-Aviv, Palestine*), vol. 2, No. 1 ; *Bulletin of the Public Museum of the City of Milwaukee*, vol. vii, Nos. 1–3 and vol. xiv, No. 1 ; *Bulletin of the Shanghai Science Institute*, vol. i, Nos. 2, 3 and 5 ; *Contributions from the Botanical Laboratory of the University of Pennsylvania*, vol. x, 1932 ; *Contributions from the Herbarium of Taihoku Imperial University*,

Nos. 19–31 ; *Field and Laboratory* (*Contributions from the Science Departments of the Southern Methodist University, Dallas, Texas*), vol. i, Nos. 1 and 2, vol. ii, No. 1 ; *Journal of the Elisha Mitchell Scientific Society*, vol. xlvii, No. 2, 1932 ; *Journal of the Faculty of Science, Hokkaido Imperial University, Series* V (*Botany*), vol. ii, No. 4 ; *Journal of the Faculty of Science, Imperial University of Tokyo*, vol. iii, pt. 2, 1931, and vol. iv, pt. 1, 1932 ; *Journal of the Natural History Society of Siam*, vol. iv, No. 3 (from Dr. A. F. G. Kerr) ; *Mededeelingen van het Botanisch Institut der Rijks-Universiteit Gent*, 1 Jaarg., 1932 ; *Meddelanden fran Lunds Botaniska Museum*, Nos. 11 and 12 ; *Mémoires de l'Académie Malgache*, fasc. xii, 1932 ; *Nederlandsch Indische Vereeniging tot Natuurbescherming* : *Verslag over de Jaren* 1929-31 ; *The Onderstepoort Journal*, vol. i, No. 1 (from Director, Veterinary Services and Animal Industry, Onderstepoort, Pretoria) ; *Phytologia, edited and published by H. A. Gleason and H. N. Moldenke*, New York Botanical Garden, vol. i, No. 1 ; *The Phytopathological Laboratory, Taihoku Imperial University, Contributions*, Nos. 13–20 ; *Publications of the Botanical Institute, Science Department, Kyoto Imperial University*, Nos. 31–33 ; *Publications of the Hartley Botanical Laboratories*, Nos. 9–10 ; *Report of the* 31*st Annual Meeting of the South African Association for the Advancement of Science* ; *Report of the Marlborough College Natural History Society*, 1932 ; *Report of the Provincial Museum of Natural History, Province of British Columbia*, 1932 ; *Revue Agrologique et Botanique*, Nos. 2–4 ; *Annual Report of the Taihoku Botanic Garden*, vol. ii, 1932 ; *Sovetskaya Botanīka*, Nos. 1–2 (Academy of Sciences, Leningrad) ; *Sunyatsenia*, vol. i, Nos. 2–3 ; *Transactions of the Academy of Science, St. Louis*, vol. xxviii, Nos. 1–2. The year of publication is 1933 unless differently stated.

Various publications have again been received from the Empire Marketing Board, the Empire Cotton Growing Corporation, the Imperial Agricultural Bureaux, and from many Departments of Botany, Agriculture and Forestry at home, in the overseas Empire, and in foreign countries.

A large number of reprints from periodicals have been received from the authors.

From the Ordnance Survey Office, Southampton, has been received a complete set of 1″-to-the-mile survey maps of Great Britain, composed mainly of the popular edition but substituted by maps of the new fifth (relief) edition so far as published. Further sheets of this later edition have been promised as they appear.

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